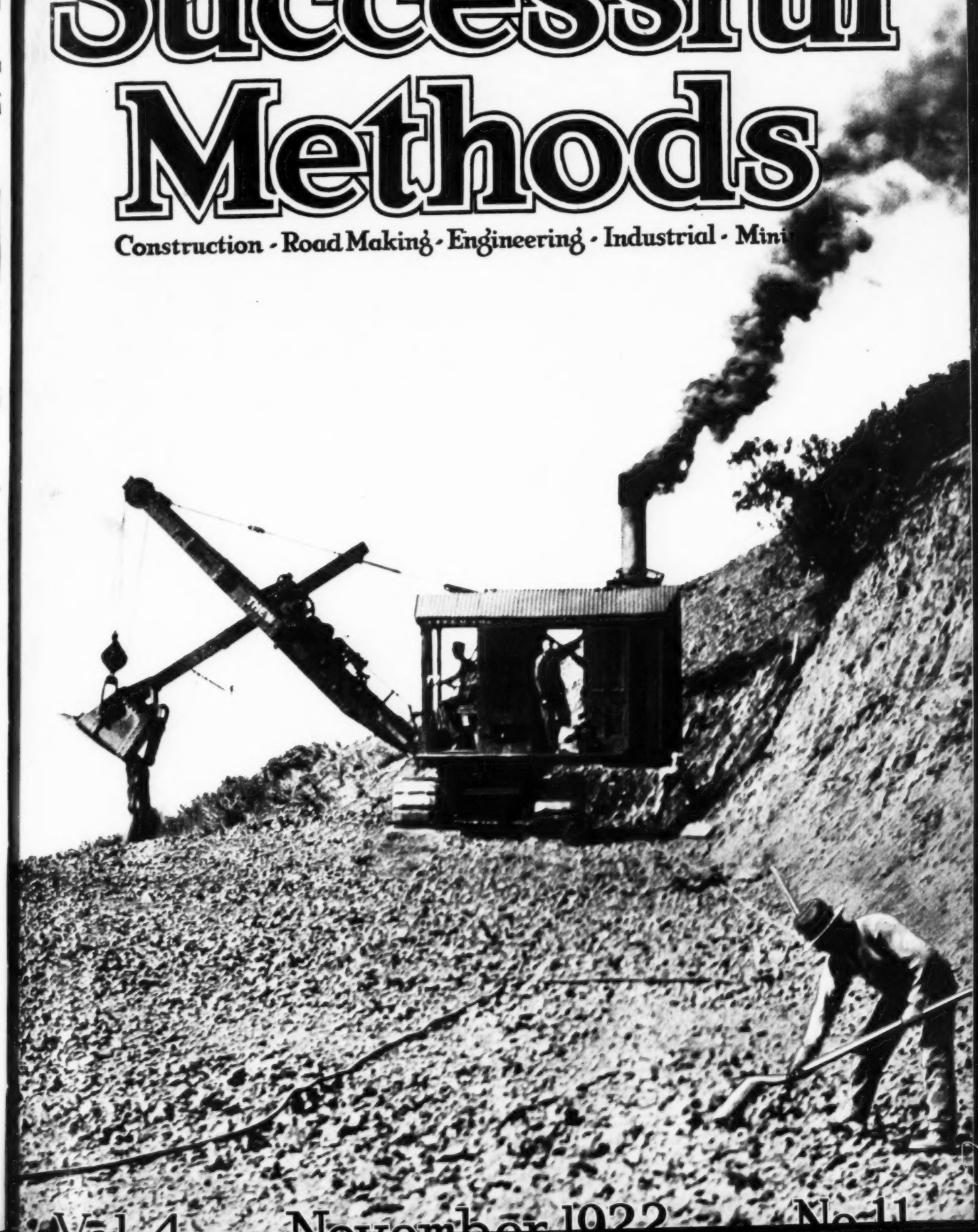
Successful Methods

Construction - Road Making - Engineering - Industrial - Mini



Vol. 4 November 1922 No. 11

On October 21, The Autocar Company Completed Its Twenty-fifth year

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Schenectady	Springfield	Wilmington	Richmond	Los Angeles	Fresno
Syracuse	New Bedford	Atlantic City	Atlanta	San Diego	San José
Fall River					

Autocar

Wherever there's a road

Successful Methods

A Magazine of Construction Service

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Road Builders Going Ahead

ELSEWHERE in this issue is a preliminary announcement of the 1923 convention and road show of the American Road Builders' Association. This announcement indicates something of the great progress that has been made recently in the affairs of the association. The reorganization of the latter since last spring has been so thorough that only those who have been active in this reorganization can realize what has already been accomplished. There remains a vast amount of work yet to be done. It is evident that the association is being rapidly strengthened, however, so that it will soon be really representative of the great highway industry of the country.

The organization which has been built up to handle the next convention and road show insures that these events will be run properly. The committee in charge of the convention program has done a particularly good job. The arrangements which it has announced make sure that a program of real value will be provided under good conditions.

In the first place, the convention is to be held in the ballroom of the Congress Hotel. This means a comfortable meeting place of ample seating capacity. It also means that the speakers will not have to talk against the noise of operating machinery in an adjoining road show, as has been the case in the past.

The next important advance step of the program committee is the kind of subjects it has selected for discussion. The old idea of a session on bituminous roads, another on concrete, a third on brick and so on has been entirely abandoned. The foolish fear of controversial subjects also has been overcome. The committee has taken several proverbial bulls by the horns. It has chosen subjects on which there is much need for light. Men who are among the leaders in working out these problems of the industry will present these subjects. Other men of equal experience and standing have agreed to lead the discussions.

Some of the papers will be printed well in advance and read by title. This procedure will give ample time for extended discussion. That many of the leading highway officials, engineers and contractors of the country will attend the convention and take part in the discussions already is certain. By the time of the convention the program committee apparently will be confronted with the problem of limiting discussions so as to give all a chance to talk.

This general plan for the convention program means that at last the highway industry is to have a public forum in which its problems can be properly presented. It means that the association will thus begin to acquire a standing commensurate with the scope and character of the industry. In this way the association will be saved from the untimely end which it certainly would have met after about one more fiasco, such as its 1922 convention.

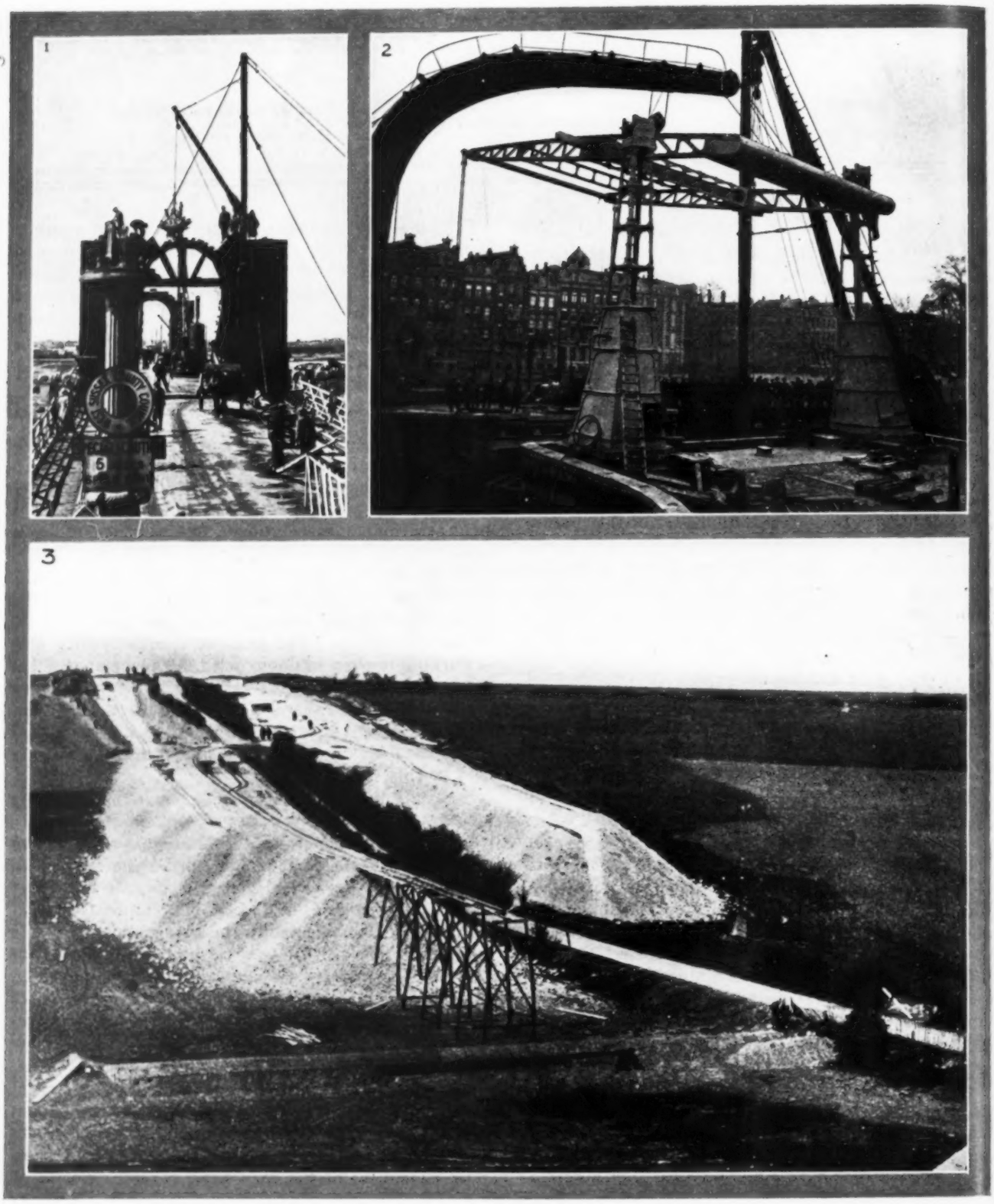
* * * * *

Success for the 1923 road show was assured regardless of what happened to the association. It is a serious question, however, whether more than one or two annual road shows could succeed independent of a strong technical association. The old cement show most certainly proved that, as successful as it was, a show of this kind could not go on alone in that field. Fortunately, it will not be necessary to risk the trial in the road building industry due to the reorganization of the association. The exhibitors' organization also is working in close harmony with the new management of the association. Plans for the road show already made under these favorable conditions by the Committee of the American Road Builders' Association insure one of the most remarkable industrial exhibitions ever held in this country.

New machines and new methods in the road building field are being developed so fast that the progressive road builders of the country must stay on their toes to keep ahead of the hounds. The road show gives all the manufacturers of the country a chance to display their latest machines and to explain the best ways of using them. It also enables the road builder to see in a few days more in the way of up-to-date equipment and methods than he can in many weeks of traveling. That the manufacturers appreciate all this is shown by the fact that the space available for exhibits will be inadequate. This is in spite of the fact that more space will be provided than at any previous show.

All who are interested in the highway industry of the country should give full credit to T. J. Wasser, state highway engineer of New Jersey, as president of the association, and to the convention and road show committee he has appointed, consisting of C. M. Upham, state highway engineer of North Carolina; S. F. Beatty, vice-president of the Austin-Western Road Machinery Company, and James H. MacDonald, consulting highway engineer, for the efforts they have made and the time they are giving to the affairs of the association.

Some Typical Samples

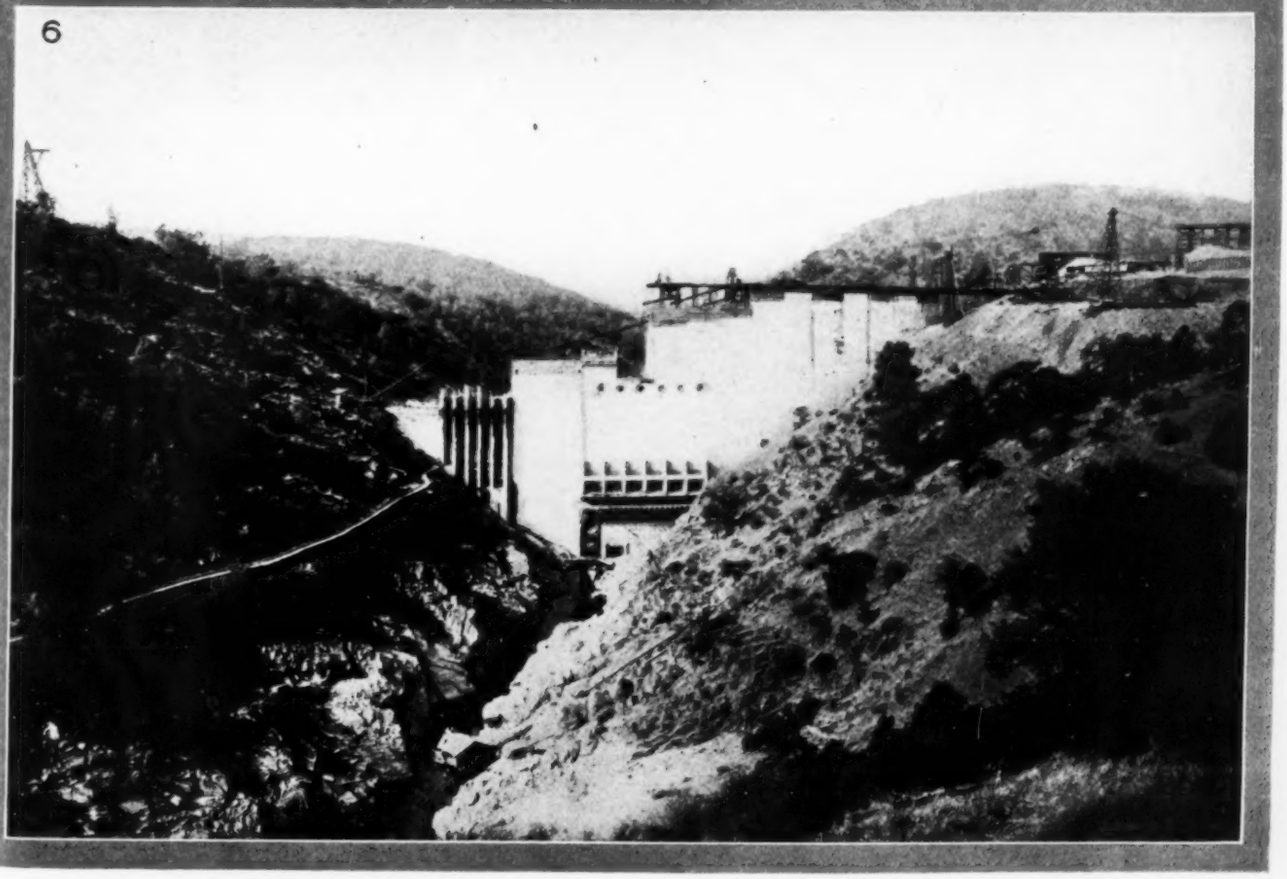


1—Bridge building at Worthing, Sussex, in England. The method of hoisting the stone in a wheelbarrow may seem a trifle precarious to the average American contractor. © *International.*

2—Another bridge picture. This one shows the placing of the steel work on a bridge across one of the canals in Amsterdam, the Netherlands. © *Keystone.*

3—An unusual photograph which shows the ambitious way in which the British road builders are reconstructing some of their highways. The original road may be seen in the center with the fills which will carry the new and wider road on either side. © *International.*

Of Construction Methods



4—Subway builders hard at work in the Friedrichstrasse, Berlin. They seem to have driven the traffic off the street just as is done in this country. © *P & A Photos.*

5—A leisurely construction job. The Benedictine monks at Buckfast have been rebuilding their abbey for the last 20 years. At no time have more than six monks been at work. © *Keystone.*

6—One of the latest hydro-electric power projects in California. The Don Pedro Dam, 41 miles east of Modesto, is nearing completion. © *Keystone.*

THE 1923 HIGHWAY PROGRAM

State Highway Departments Furnish Statistics on Carry Over and New Work

IN an effort to keep its readers informed in regard to the approximate amount of highway construction which is on the program for 1923, SUCCESSFUL METHODS has queried the various State highway departments asking; first, the mileage which will not be completed this year and therefore will be carried over into next year, and second, the plans for new construction during 1923.

In this issue the summaries of the replies from about half of the forty-eight States are printed. All sections of the country are represented and a good cross section of the highway situation in the entire nation is given.

A recapitulation of the figures given shows that in the states named below, approximately 3226 miles of highway construction will be carried over from this season into next year and approximately 8186 miles of new construction are planned.

In the December issue SUCCESSFUL METHODS will present the replies from the remainder of the State highway departments or as many of them as it proves possible to obtain.

COLORADO

L. D. BLAUVELT, STATE HIGHWAY ENGINEER

"THE projects carried over from this year into 1923 will probably total about $2,600,000, which may be divided approximately as follows: graded roads, 168 miles; gravel surfaced, 70 miles; rock surfaced, 8 miles; shale, 8 miles; concrete pavement, 24 miles; bridge projects, 3 miles.

"In addition we contemplate that new work will probably be carried on to the extent of about $2,600,000, of which $1,600,000 will probably be Federal Aid projects and the remainder state projects. Fifteen to twenty miles of paving probably will be included in this work and the balance of perhaps 180 miles will be graveled roads."

DELAWARE

C. D. BUCK, CHIEF ENGINEER

"OUR 1922 work consisted of 77 miles of concrete roads. We have completed 65 miles of this, and expect to complete all but about 5 miles, which will be carried over into 1923. This will be 16-ft. roadway, 6 in. and 8 in. thick of 1-2-4 mix.

"As our next year's program is dependent upon the action of the Legislature which meets in January and is to be elected in November, we can give you no definite information at this time. However, if the Legislature provides the means, we are organized to construct about 75 miles, which probably will be concrete of the same type mentioned above."

FLORIDA

WM. F. COCKE, STATE HIGHWAY ENGINEER

"THIS state probably will carry over into 1923 as unfinished work approximately 10 miles of temporary sand clay or marl surface, 60 miles of asphalt surface and 20 miles of cement concrete surface.

"Proposed new work for 1923 will, to a very large extent, be contingent upon appropriations to be made by the State Legislature, which convenes next spring. It is expected that the Road Department will ask for bids on approximately 20 miles of temporary surface, to be built of local materials, and approximately 135 miles on which alternate bids will be asked covering asphalt, concrete and vitrified brick pavements.

"Attention is called to the fact that the foregoing applies only to such work as will be done under this Department upon the state highway system. The 61 counties of the state will doubtless undertake work totaling several times the figures given above. However, this Department will have no connection with the activities of the several counties."

ILLINOIS

FRANK T. SHEETS, SUPERINTENDENT OF HIGHWAYS

"AS nearly as we can determine at this time we will carry over into 1923, 478 miles of unfinished pavement contracts. We will let between 600 and 700 miles of additional contracts, making our total program for the year between 1100 and 1200 miles."

INDIANA

C. GRAY, CHIEF ENGINEER

"WE have about 117 miles of hard surfaced road work under construction this year and think we will complete about 80 miles. We anticipate awarding contracts for about that much mileage next year."

KANSAS

M. W. WATSON, STATE HIGHWAY ENGINEER

KANSAS has at this time about 300 miles of various types of road under construction, and is continually letting new work, but it is hardly likely that at any one time during the next year there will be more than 300 miles under contract. It is probable that next year will show the award of approximately 300 miles of new work, which will be more along the line of grading and culvert construction than during the present year.

KENTUCKY

JOE S. BOGGS, STATE HIGHWAY ENGINEER

"WE estimate that the following will be carried over into the 1923 season: Reinforced concrete, 8 miles; grade and drain, 25 miles; rock asphalt, 7 miles; bituminous macadam penetration type, 10 miles, and bank gravel, 2 miles.

"The 1923 program of letting will include approximately the following lengths of road under types mentioned: Reinforced concrete, 20 miles; grade and drain, 100 miles; rock asphalt, 20 miles; bituminous macadam, penetration type, 30 miles; gravel, 15 miles, and waterbound macadam, surface treated, 15 miles."

MASSACHUSETTS

A. W. DEAN, CHIEF ENGINEER

"OUR unfinished contracts, the completion of which will have to be carried over into next year, will include in all probability about 5 miles of cement concrete, 2 miles of bituminous concrete, 17 miles of bituminous macadam and 5 miles of gravel road.

"It is not possible at this time for us to give an estimate of the amount of mileage that we expect to construct next year, but it is fair to estimate that next year operations will be of no less magnitude than those of this year, which consisted of about 209 miles of highways of various types."

MICHIGAN

FRANK F. ROGERS, STATE HIGHWAY COMMISSIONER

"THE construction season is not yet over in Michigan and the amount of work which will be carried over into 1923 cannot be definitely computed at this time. However, it now appears that there will be about 443 miles of work on which contracts have been awarded which will not be surfaced before next year. This is divided as follows: 280 miles of gravel, 43 miles of waterbound and bituminous macadam and 120 miles of pavement.

"Our 1923 construction program is not yet finally

approved and therefore I cannot give you any definite information concerning same. However, the program will probably include about 1000 miles of construction of which approximately 250 miles will be of the pavement type, about 50 miles macadam, about 600 miles of gravel and the balance grading and drainage only."

MISSISSIPPI

H. C. DIETZER, STATE HIGHWAY ENGINEER

"WEATHER conditions in this state are such that our work progresses through the winter and no work is carried over until spring. We expect to let for construction during 1923 approximately 75 miles of concrete paving, 4 miles of brick paving and 75 miles of gravel surfacing."

NEVADA

GEORGE W. BORDEN,
STATE HIGHWAY ENGINEER

"THE projects now under construction which will be carried over into next season will consist of: grading and gravel surfacing 58 miles, and asphaltic macadam surfacing, 15.5 miles. About two-thirds of the work is completed on the gravel job while the asphaltic macadam work is just started.

The mileage to be built in 1923 consists of: concrete, 3.25 miles; asphaltic macadam, 2.5 miles; gravel, 190 miles. In addition there will be built the usual culverts on road contracts and probably one 200-ft. bridge and several railway grade crossing elimination structures.

THE MIDLAND TRAIL IN FAYETTE COUNTY, KENTUCKY. THE REINFORCED CONCRETE SURFACE HAS JUST BEEN COMPLETED.

NEW JERSEY

T. J. WASSER, STATE HIGHWAY ENGINEER

"IT is very difficult to state the number of miles of highway under construction that will be carried over into next season for the reason that the conditions under which highways are built in New Jersey are somewhat different from the other states. For instance, state highways or sections thereof, now under construction will be practically completed, but there are several miles of county roads in which the state is partially interested financially and there are county roads which are built exclusively by the counties, and it would be necessary for the state to send a questionnaire to the several counties to ascertain how many miles will be completed and how many carried over. This cannot be answered with any degree of accuracy owing to the railroad situation on the open top car service and the embargoes on all our eastern railroads. It is fair to assume, however, that there will be very few detours in use during the winter.

Our program for next year would likewise be governed by the conditions above mentioned. The State has no knowledge as yet of what the counties' program is for next year, and the State's program is solely dependent upon the referendum for the $40,000,000 bond issue which comes up at election on November 7th."

NEW MEXICO

L. A. GILLETT, STATE HIGHWAY ENGINEER

"WE are not in a position to know what work we will carry on next year, or the class of work, on account of the fact that we are awaiting an opinion from the Comptroller of the Currency relative to construction of Federal roads across Indian Pueblo Grants. Until this is settled, we, ourselves, will not know what construction will go on next year in this State."

NORTH DAKOTA

W. H. ROBINSON, CHIEF ENGINEER AND SECRETARY

THE work carried over from 1922 to 1923 will consist of 100 miles of grading and draining and 25 miles of gravel surfacing. The new work contemplated for 1923 consists of 300 miles of grading and draining and 150 miles of gravel surfacing. It also is possible that North Dakota may build 4 or 5 miles of concrete surfaced roads next year. The figures given are a rough estimate.

OHIO

E. C. BLOSSER, STATE HIGHWAY ENGINEER

"WE had under construction during the year 1922 over 1000 miles and would have completed the entire program had it not been for the conditions that we encountered. For this reason we were forced to carry over approximately 350 miles. Our program for next year involves the construction of approximately 500 miles."

OREGON

HERBERT NUNN,
STATE HIGHWAY ENGINEER

"IT is expected that we will carry over uncompleted mileages into 1923 approximately as follows: grading, 100 miles; rock or gravel surfacing, 225 miles.

"While no definite program as yet has been decided upon for next year, it is probable that the work awarded will be approximately as follows: grading, 125 miles; broken stone or gravel surfacing, 150 miles, and pavement, 30 miles."

PENNSYLVANIA

W. D. UHLER, CHIEF ENGINEER

"AS nearly as we can estimate at the present time, there will be approximately 125 miles of reinforced concrete pavement, and 5 miles of bituminous surface on concrete base uncompleted on our contracts this season, which work will be carried over into next year.

"As to an estimate of the amount of mileage of highways which this Department expects to build next year, exclusive of that carried over, due to the fact that this Department will have no funds for highway work next year until after appropriations have been made by the Legislature, which does not meet until January, 1923, we are unable to give you any idea at this time as to the probable amount of highway work that will be done by the Department next year."

SOUTH CAROLINA

CHAS. H. MOOREFIELD, STATE HIGHWAY ENGINEER

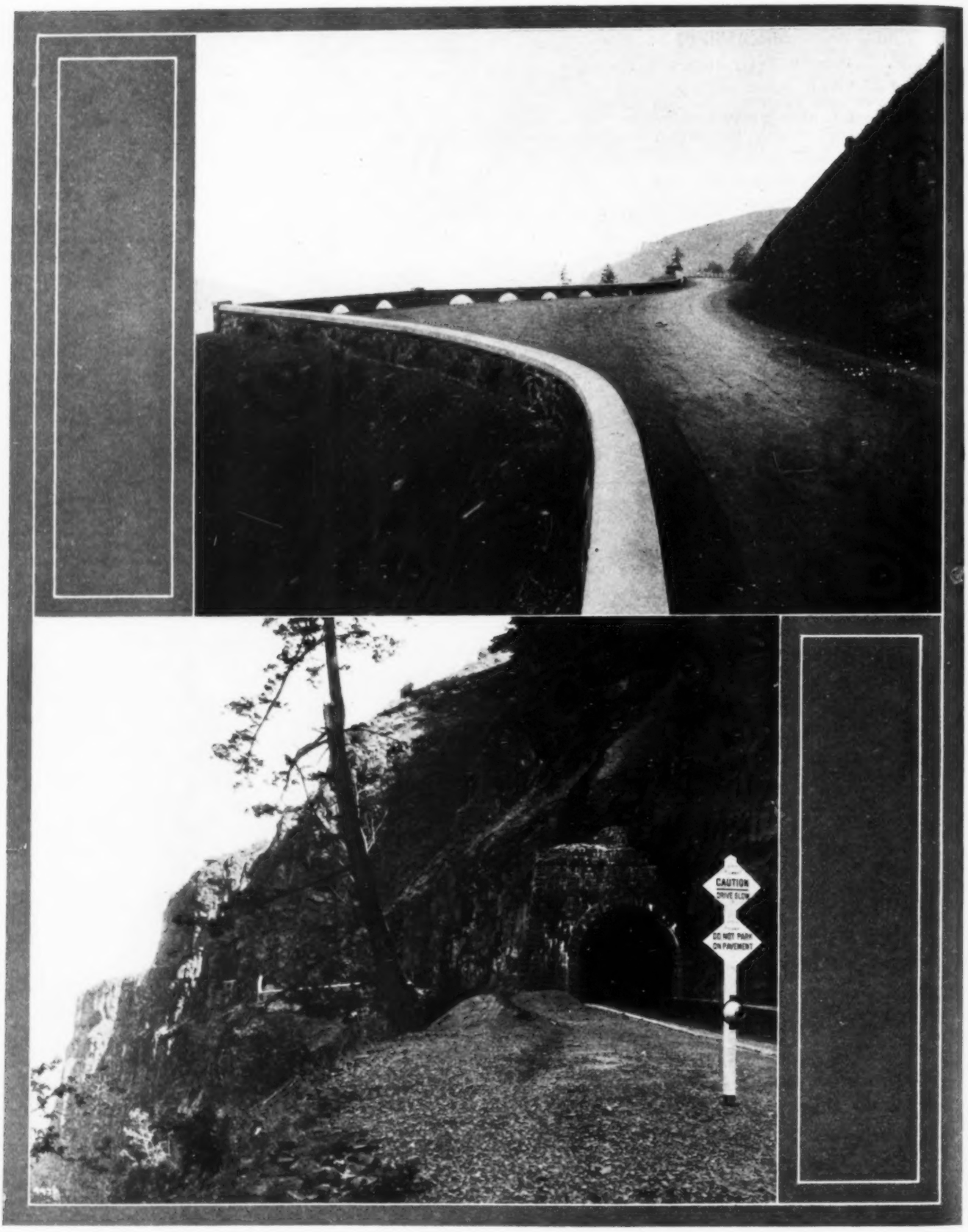
"AT the present time we have under construction about 20 miles of 18-ft. concrete pavement and about 30 miles of sheet asphalt and asphaltic concrete, on cement concrete base, all 18 ft. wide.

"We will complete during the present year a total of about 50 miles of concrete pavement and about 30 miles of asphaltic surfacing on concrete base, and it is probable that the total of next year's work will be at least that much.

"We have under way also more than 300 miles of sand-clay, top-soil and gravel construction and are completing this work at the rate of about 30 miles per month. It is probable that approximately the same rate will be maintained during the coming year.

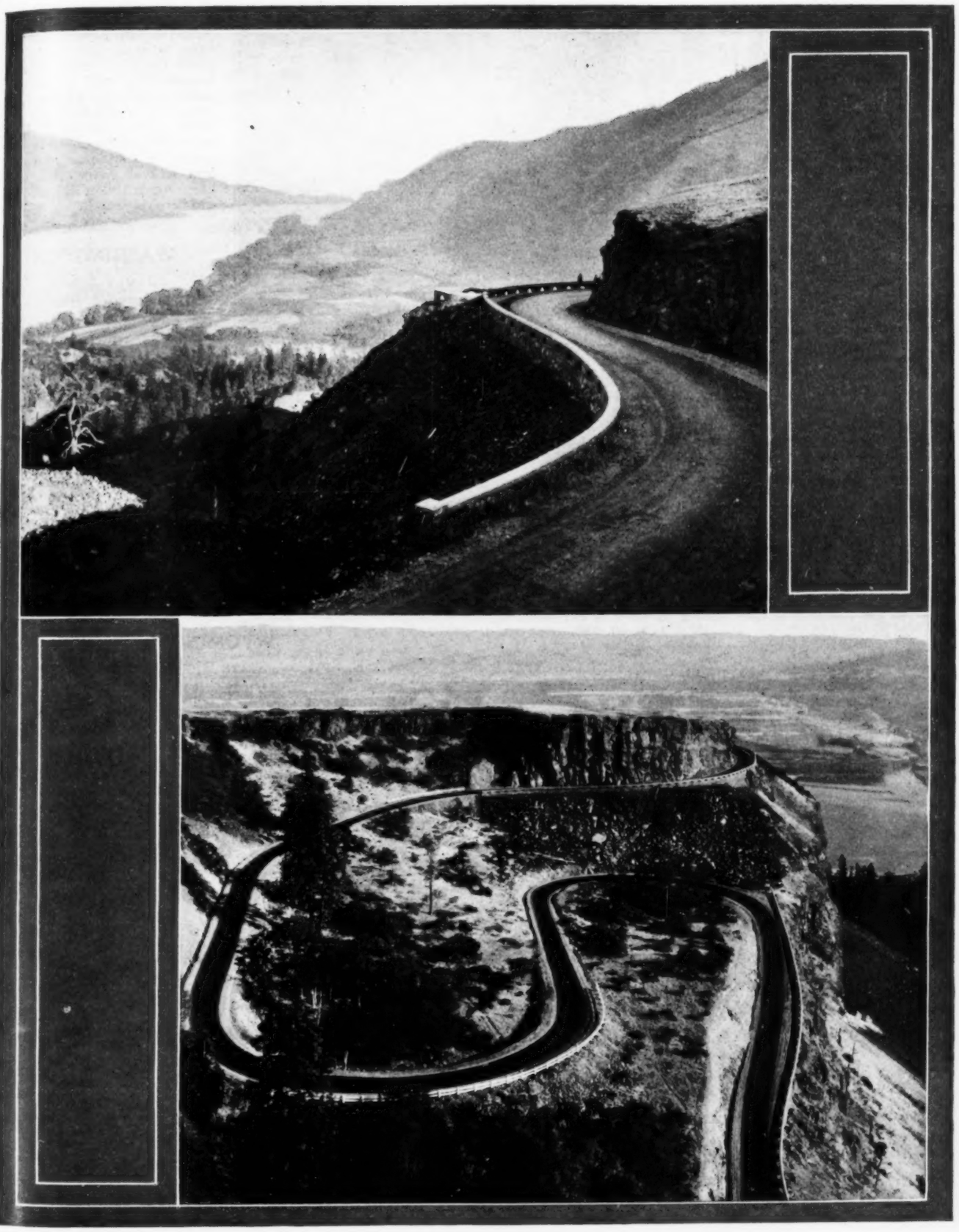
"In addition to the road work, we are building several sizable bridge projects, including a bridge over the Santee River, which, with the approaches, will cost nearly $1,000,000 and two interstate bridges over the Savannah River, one near Augusta and the other near Savannah, which will cost respectively about $250,000 and $600.000."

The Columbia River Highway



Above—Parking space and observation point in Hood River County.
Below—One of the tunnels on the highway. Attention is directed to the observation galleries which permit tourists to alight and enjoy the view.

Of Which Oregon Is Justly Proud



Above—Typical section of the highway in Wasco County, showing the river in the distance.
Below—The Rowena Loops in Wasco County. This section of the highway consists of continuous grade. The guard wall at the right is curved in order to provide parking space for cars clear of the pavement.

TENNESSEE

D. Q. McComb, Chief Engineer

"OUR program of construction during the year 1921 embraced 44 state and Federal Aid projects, having a total aggregate length of 485.63 miles constructed or being constructed at an approximate cost of $11,300,000. Of this amount 80.72 miles were completed during the year 1921 at an actual cost of $2,052,270.16.

"Our construction program for the year 1922 embraces the award of contracts for the construction of 102.78 miles of highway at an estimated cost of $3,454,809.39. Of the projects included in this 1922 program, it is contemplated that all contracts will be well under way by January 1, 1923.

"Our contemplated 1923 program of highway construction embraces 133.62 miles to be built at an estimated cost of $2,874,317, making a total of 722.03 miles of highways, of which 90 per cent will be of the very highest type of construction, including cement concrete pavement, bituminous concrete on cement concrete base, rock asphalt surface on Telford base, and bituminous macadam penetration on Telford base."

A SECTION OF THE NATIONAL HIGHWAY IN CHEROKEE COUNTY, SOUTH CAROLINA.

TEXAS

J. D. Fauntleroy, State Highway Engineer

"CONSTRUCTION work is not limited by the seasons in Texas. We are letting contracts every month in the year and work is in progress during all seasons of the year. For this reason no work is carried over."

UTAH

Howard C. Means, State Road Engineer

"A NUMBER of Federal aid projects are being completed at the present time and it is probable that approximately 70 miles of highway will be carried over into next season. On a number of projects which will be begun next year it is possible that some of the heavy grading work will be done during the winter.

"The plans for 1923 are indefinite at the present time, but probably will include approximately 9 miles of hard surface pavement in Utah County between Payson and the Juab County line. The cost of this project will be in the neighborhood of $35,000 per mile."

VERMONT

Thurman W. Dix, Commissioner of Highways

"WE shall probably carry over about 4 miles of bituminous construction which will be very nearly completed and probably some 10 or 12 miles of gravel construction, most of which will be very nearly completed.

"It is not possible at this time to state what our program for 1923 will be for the reason that the Legislature meets in the meantime. However, it is hoped that we shall have a program of 50 to 75 miles of Federal Aid concrete, bituminous macadam and gravel roads and probably some 100 miles of state aid gravel roads."

WASHINGTON

James Allen,
Supervisor of Highways

"HIGHWAY work which will be carried over into next season in Washington consists of: grading approximately 40 miles; paving with concrete approximately 7 miles, and three bridges, one a 1454-ft. steel bridge, another a 293-ft. steel swing draw bridge and the third a 702-ft. steel vertical lift bridge. In addition the State Highway Department has arranged for the delivery of 50,000 cu. yd. of concrete aggregates between Kalama and Toledo on the Pacific Highway for 1923 paving.

"A rough estimate of the mileage of road to be built next year is as follows: grading and surfacing with crushed rock or gravel 200 miles, and paving with concrete 50 miles."

WYOMING

Z. E. Sevison, State Highway Engineer

IT is probable that about 200 miles of road contracts will be carried over into next season, although favorable weather may permit of the reduction of this figure to a considerable extent.

"Plans for next season depend entirely upon the action of the Legislature, although the highway department is hoping that enough state funds will be provided to match the available Federal Aid funds and carry on a reasonable construction program of about 250 miles of new road."

At present the highway department has exhausted the available funds so that some action by the legislature is imperative if the comprehensive highway program which has been so well carried out thus far is to be continued.

MAKING READY FOR THE ROAD SHOW

WITH the early start that was made during the summer through a partial reorganization and an election of officers in the American Road Builders' Association and the creation of the Highway Industries Exhibitors' Association to bring about closer co-operation, arrangements are rapidly being made for the Thirteenth American Good Roads Congress and Fourteenth National Good Roads Show to be held in Chicago, Jan. 15, 16, 17, 18 and 19, 1923.

It is the intention to separate the congress and show by holding the former at the Congress Hotel and the latter as usual at the Coliseum. It is believed this arrangement will be more satisfactory as it will obviate the necessity of shutting down the operating machinery during the sessions and will eliminate the noise that has proved so annoying to speakers and delegates at the convention. The new arrangement also is expected to increase the attendance at each session of the congress.

Shortly after his election, Thomas J. Wasser, president of the American Road Builders' Association for 1922-1923, appointed to the executive committee the following: Charles M. Upham, State highway engineer for North Carolina; James H. MacDonald, con-

sulting highway engineer, New Haven, Conn., and J. H. Cranford of the Cranford Paving Company, Washington, D. C. By reason of his position as secretary, E. L. Powers became ex-officio a member of the committee.

This committee, acting for the A. R. B. A., appointed Messrs. Upham and MacDonald, and the Highway Industries Exhibitors' Association designated its president, S. F. Beatty to act as a committee having general charge of the arrangements for both the show and the congress. The committe is known as the Convention and Show Committee.

This committe has now created several sub-committees to have charge of the various detailed arrangements as follows: Transportation Committee, Royal M. Allen, chairman; General Publicity Committee, S. T. Henry, chairman; Chicago Press Committee, W. R. Harris, chairman; Exhibitors' Committee, C. R. Ege, chairman; Entertainment Committee, A. C. Cronkrite, chairman; Reception and Hotel Commitee, John B. Hittell, chairman; Registration Committee, L. S. Louer, chairman; Banquet Committee, Joseph R. Draney, chairman; Program Committee, E. J. Mehren, chairman.

The Exhibitors' Committee has employed a professional director of exhibits, C. W. Kelley of Chicago, who, though never before identified with the road show, has managed some of the biggest expositions in the country, and the Publicity Committee has re-engaged C. S. Lee of New York, who handled the publicity work for the shows and conventions in 1921 and 1922.

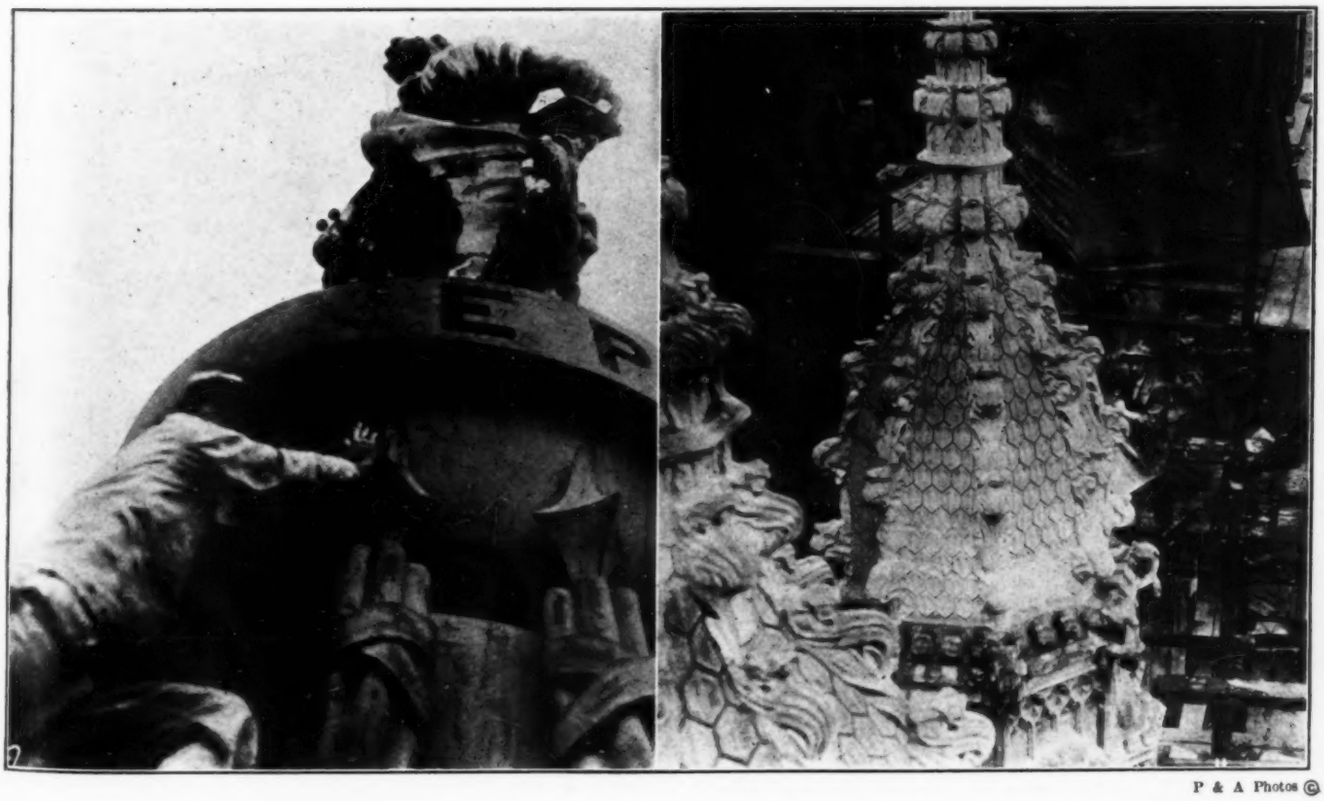
According to Chairman Upham of the Convention and Show Committee the chief difficulty will be encountered in providing space for all the exhibits, though arrangements will be made for all the additional space it is possible to obtain. "The Highway Industries Exhibitors' Association," said Mr. Upham, "is giving us splendid co-operation in working out the arrangements. We expect to conduct a publicity campaign of greater compelling force and more far-reaching effect than ever before and I believe the attendance will break all records.

"The program for the congress as it is being worked out by the Program Committee, will be the exact reversal of our previous ones. Instead of avoiding controversial subjects as in the past the program next year will be made up almost entirely of controversial subjects of interest to the road-building industry as a whole. This, we believe, will greatly increase the interest in the program and will provoke highly interesting and instructive oral discussions from the floor."

The American Road Builders' Association has opened new offices at 37 West Thirty-ninth Street, New York City, the old ones at 11 Waverly Place having been abolished. Headquarters will also be opened in Chicago long in advance of the congress and show.

AMERICA AND ENGLAND KEEP UP APPEARANCES

TWO of the most famous buildings in the world have recently been going through a refurbishing process. Both of the photographs below require a little study in order to tell just what they are. The one on the left is taken high up on the dome of the Capitol in Washington. The photograph on the right shows a man at work on the preservation of Henry VIII's chapel in Westminster Abbey.



P & A Photos ©

MODERN METHODS SPEED WORK

Fast Progress on Shandaken Tunnel Due Largely to Use of Up-to-Date Machines Wherever Possible

By Robert S. Arthur.

ORGANIZATION, teamwork and modern machines plus 2,500,000 lb. of explosives is the formula used by the Ulen Contracting Corporation for making remarkable progress on the driving of the Shandaken Tunnel, the last leg of the 130-mile artificial channel which leads Catskill Mountain water to the City of New York at the rate of 600,000,000 gal. daily.

The tunnel is 18.1 miles long, which is 1586 ft. longer than the city tunnel of the Catskill aqueduct, heretofore the longest tunnel in the world for any purpose. It is horseshoe in section, about the size of a single track railway tunnel, is concrete lined with inside dimensions of 11 ft. 6 in. in height by 10 ft. 3 in. in width, and provides for a uniform slope of 4.4 ft. per mile, except for the northerly 3½ miles, which is depressed, making that portion a pressure tunnel. The intake is located about 3½ miles north of the village of Prattsville, from which point the tunnel extends in a southeasterly direction to just south of the village of Allaben, where it discharges into Esopus Creek, whence it flows into the Ashokan Reservoir. In other words, it is a channel built to connect the existing Ashokan Reservoir with the Schoharie Reservoir, which will be formed by the Gilboa Dam, now under construction.

FINISHED SECTION OF THE TUNNEL

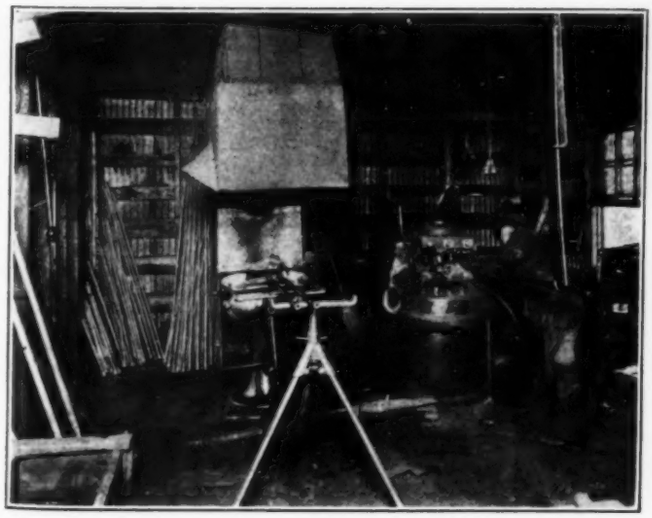
SHAFT NO. 5 ON THE SHANDAKEN TUNNEL. THIS PHOTOGRAPH WAS TAKEN LAST WINTER.

The average depth of the tunnel is 600 ft. There are seven intermediate shafts, the maximum depth being 630 ft. The minimum distance between shafts is 1.3 miles and the longest 2.7 miles. All shafts are circular and lined with concrete, and will be covered with permanent shaft houses built of native stone. The upper portion of the intake shaft is so constructed as to act as a Venturi meter and the building over this shaft will house the control gates.

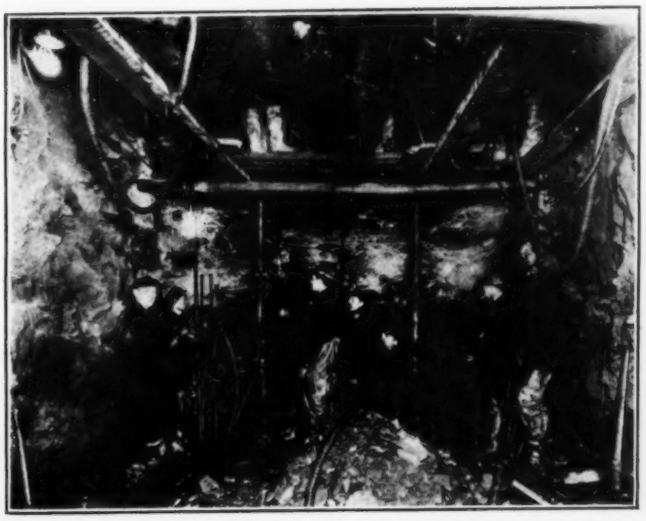
One of the illustrations shows the rock work in

AN END VIEW OF A COMPLETE SECTION IN PLACE.

progress. Each shaft is in charge of a superintendent thoroughly competent in that class of work. He has at his command the last word in mechanical equipment. For instance, the rock is drilled by means of compressed air, there being a total of 3000 8-hour drill shifts per month using up to 16-ft. steels in hard sandstone. The drills average 20 lin. ft. per drill hour. What hand shoveling is required is done by means of pneumatic spades. These tools are used in clay digging and shale.



ONE OF THESE TOOL SHARPENING SHOPS IS INSTALLED AT EACH SHAFT MOUTH.



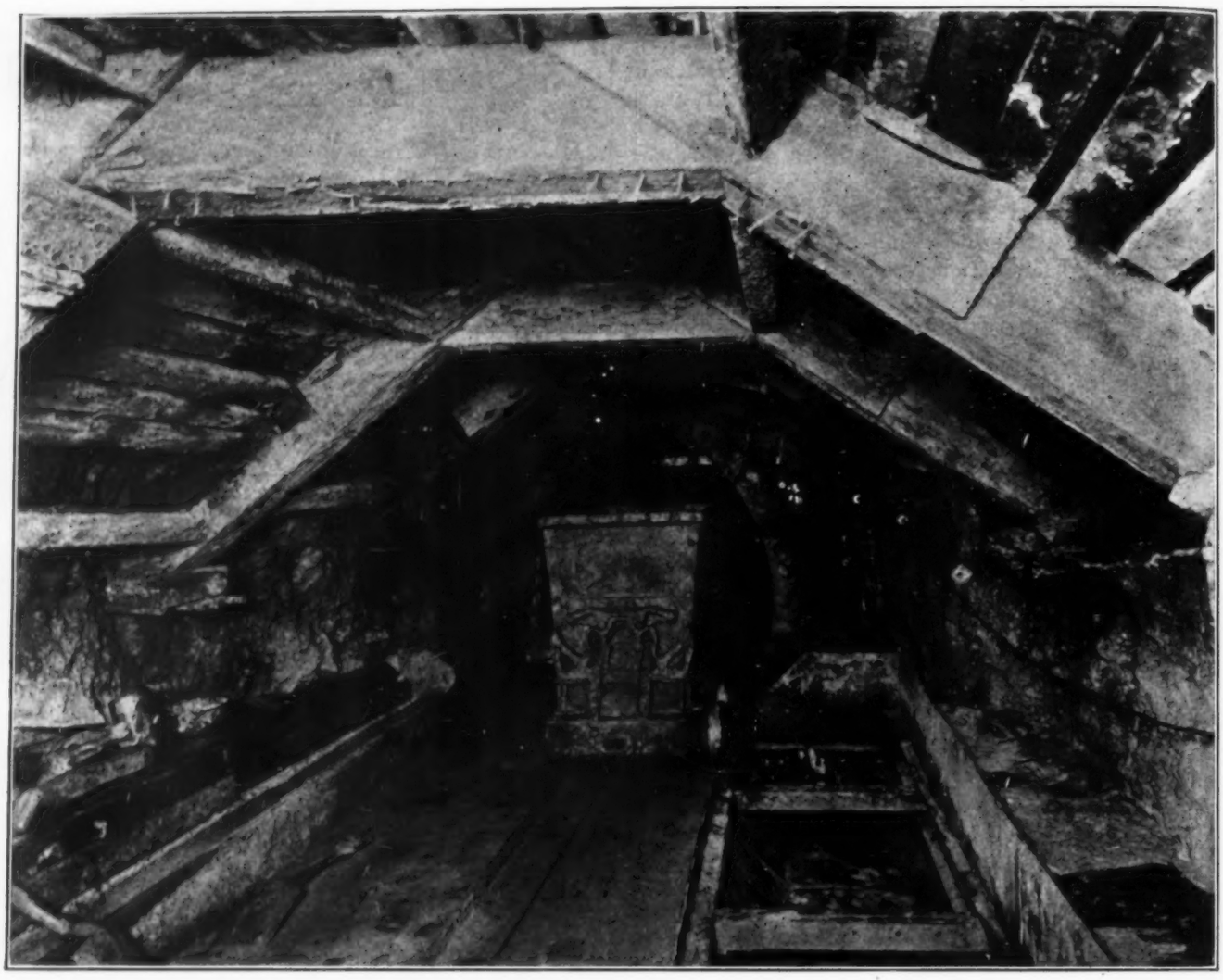
DRIFTERS IN HEADING, SHOWING HOW EVENLY WORK IS CARRIED ON.

An electrically driven, specially designed shovel, having a capacity about equal to a small steam shovel loads cars, which are hauled by means of electric locomotives to the shafts, where they are hoisted by electric mine hoists. On the surface, rock suitable for concrete work is run through a crusher and reclaimed.

The reason for the progress made on this work by the contractors, which is just about the fastest ever made on such a job, is due to the attention to detail

SHOWING ROOF OF TUNNEL WITH TIMBER IN BAD GROUND.

in connection with the above methods. For example, the method of lubrication of the drills required constant change to suit the class of labor available. What one type of laborer could understand or pay attention to, another type might not. Therefore the usual methods were not always followed. At each shaft a complete blacksmith shop has been installed, equipped with an oil furnace and drill sharpener, shank and punch, by means of which sharp drill steel



PLACING THE CONCRETE LINING WITH COMPRESSED AIR. THE CONCRETE IS DUMPED FROM THE CAR INTO THE TROUGH AT THE RIGHT AND THEN FORCED THROUGH THE HOSE.

is kept on hand at all times. By means of the drill sharpener an average of 80 steels are sharpened in an hour, whereas by hand two men could do only 20. The speed of the drilling depends on the sharpness of the steels and by constant supervision and inspection the drills are kept in proper shape.

The concreting operation is an interesting one, and is a departure from the usual method of placing concrete tunnel lining. The photograph on this page shows the side dump mine car which carries the mixed concrete from the mixer. The car dumps into the hopper shown at the right. Below and not shown in the illustration is the gun or tank by means of which the concrete is forced by compressed air through the large hose seen in the background and deposited behind the collapsible steel forms. The invert is poured first, then the sides, and finally the top arch.

The entire plant is operated by electricity, storage-battery locomotives being used to haul muck both in the tunnel and on the surface. Power is furnished by a 48-mile high tension line from Kingston, N. Y., where connection is made with the Central Hudson Gas and Electric Company's lines.

At present there are about 1500 men employed on the work and the best records made are as follows:

Maximum monthly excavation in 12 headings.....5,593 ft.
Maximum weekly excavation in 12 headings.....1,362 ft.
Maximum monthly excavation in one heading.... 608 ft.
Maximum weekly excavation in one heading..... 150 ft.

The work is under the direction and supervision of the Board of Water Supply of New York City. The contract for the construction of the tunnel was awarded to the Degnon Contracting Co. on Nov. 9, 1918, at an estimated cost of $12,138,738. The Ulen Contracting Corporation took over the work in November, 1920. At the present time the excavation is about completed and the entire contract will be finished one year ahead of the time specified in the contract.

The fact that such good progress is being made is due largely to the use of modern machinery wherever possible. The contractors have gone at their problem with the object of getting the job done with the aid of machines whenever they can replace hand labor in that particular class of work and the results of that policy are justifying its adoption. Time, labor and money are being saved daily.

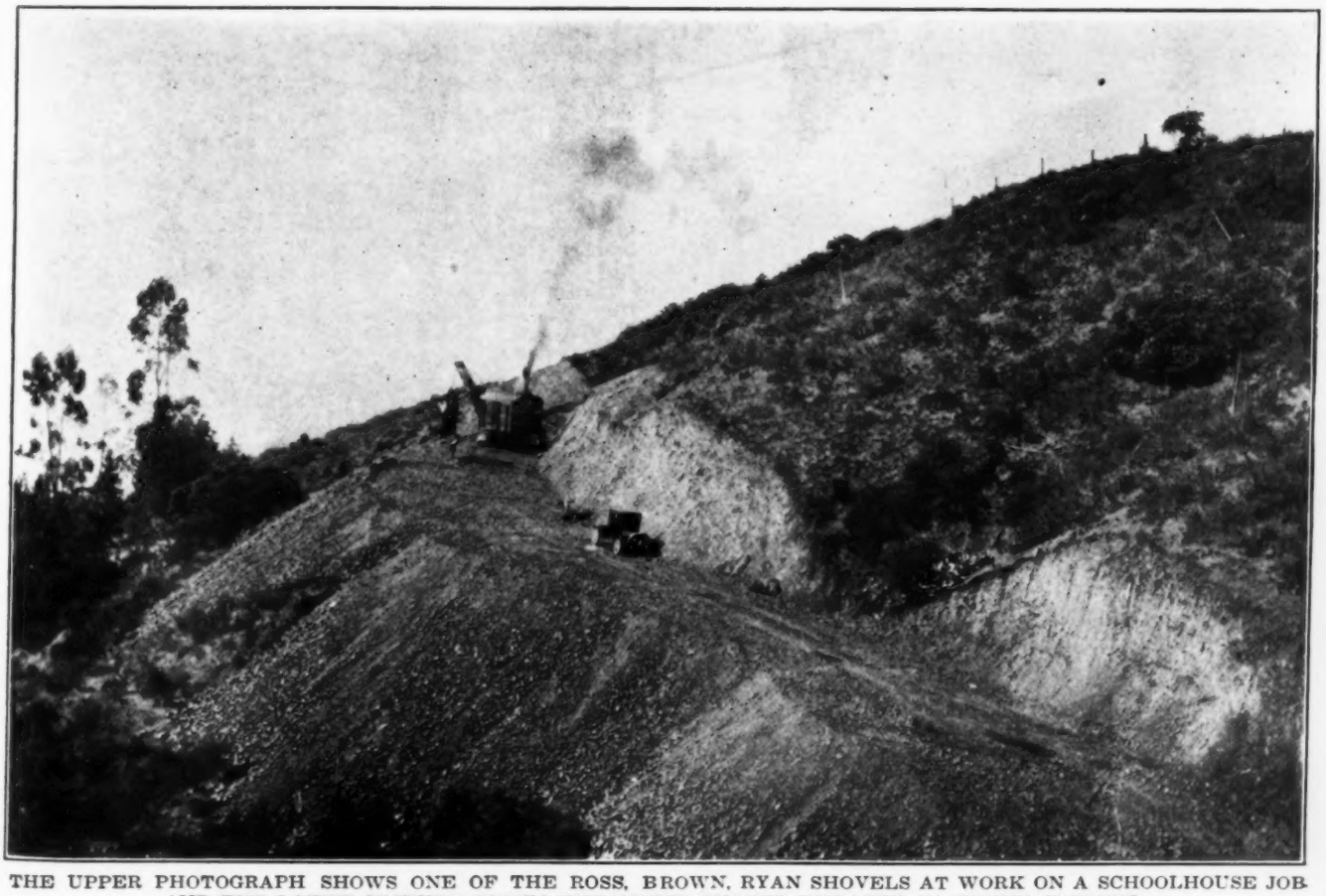
KEEPING A PAIR OF SHOVELS BUSY

THREE practical shovel runners out in Los Angeles are proving that it is possible to keep a couple of steam shovels busy most of the time. Matt Ross, Ralph Brown and Charles B. Ryan are the trio who are always ready to put in a bid when there is any excavating to be done in Los Angeles or its vicinity.

The photograph on the cover of this issue of SUCCESSFUL METHODS and the photograph at the bottom of this page show one of their shovels engaged on a contract consisting of 6 miles of highway excavation, most of which is castover work, as may be seen from the photographs. Altogether about 100,000 cu. yd. will be moved before the job is finished. This work is being done at Hollywood, the moving picture capital. The shovel which they are using is equipped with continuous tread traction.

At the same time that these photographs were taken, the other shovel was busy on a schoolhouse job in Los Angeles. This particular job attracted a great deal of attention from the passersby because it was necessary to crib up the building to a height of 14 ft. and to send the shovel under it in order to make the necessary excavation. The upper photograph on this page shows this shovel at work.

The success of these three men in keeping both their shovels busy shows the possibilities of the construction field when viewed from the standpoint of the owner of efficient machinery. There is real money in it.



THE UPPER PHOTOGRAPH SHOWS ONE OF THE ROSS, BROWN, RYAN SHOVELS AT WORK ON A SCHOOLHOUSE JOB AND THE LOWER PICTURE SHOWS THE OTHER SHOVEL ENGAGED IN HIGHWAY WORK.

REPAVING A BUSY CITY STREET

Asphalt Wearing Surface on a Bituminous Base Laid on Washington Boulevard in Chicago

By John B. Hittell

THE repaving of a busy city street is an operation which requires careful planning, and various factors have to be taken into consideration which are not present in road building in less populous districts. The West Park Commissioners of Chicago recently decided to repave Washington Boulevard from Halsted Street to Ogden Avenue, a distance of 4630 ft.,

RAKING THE SECOND LAYER OF THE BITUMINOUS BASE.

and before beginning work they made a thorough study of the section with special regard to traffic.

Washington Boulevard has ceased to be a purely residential boulevard and is close to several important business sections. In addition there are a number of

TEEING THE TOP OF THE BLACK BASE BEFORE LAYING THE WEARING COURSE.

intersecting streets which do not cross the boulevard which makes it necessary for traffic from them to turn into the boulevard and proceed for at least a block to the next street leading out in the desired direction. This, of necessity, makes the boulevard carry considerable business traffic.

THE FINAL OPERATION—TWO ROLLERS FINISHING THE ASPHALT WEARING COURSE.

The old pavement consisted of asphalt laid in 1893 on a macadam foundation, and it was finally decided to replace it with a 2-in. wearing course of asphalt laid on a bituminous foundation over the old macadam base. In the interval between 1893 and the present, numerous disturbances of the old base had occurred, one corporation having made openings every 25 ft. along the entire length of the street.

The work was awarded to the Commonwealth Improvement Company and the bituminous base was laid in two courses. The two small photographs show the work of laying this base and the large photograph shows the final rolling of the 2-in. wearing surface.

One important consideration was speed, as the job was done fairly late in the fall and it was important that it should be finished before the cold weather. Inasmuch as the roadway is 48 ft. wide and, as said before, the length paved was 4630 ft. a yardage of approximately 26,000 sq. yd. was involved.

For the West Park Commissioners, William G. Barclay was in charge with William G. Keith, engineer; Thomas Newton, field engineer, and William A. Basse, inspector, all engaged in the work under him. William G. Foley was the foreman in charge for the Commonwealth Company, which is managed by Alexander Todd and Walter Leininger.

A QUICK RISE IN COTTON

Memphis Contractors Put up Unusual Exhibition Building in Three Days' Time

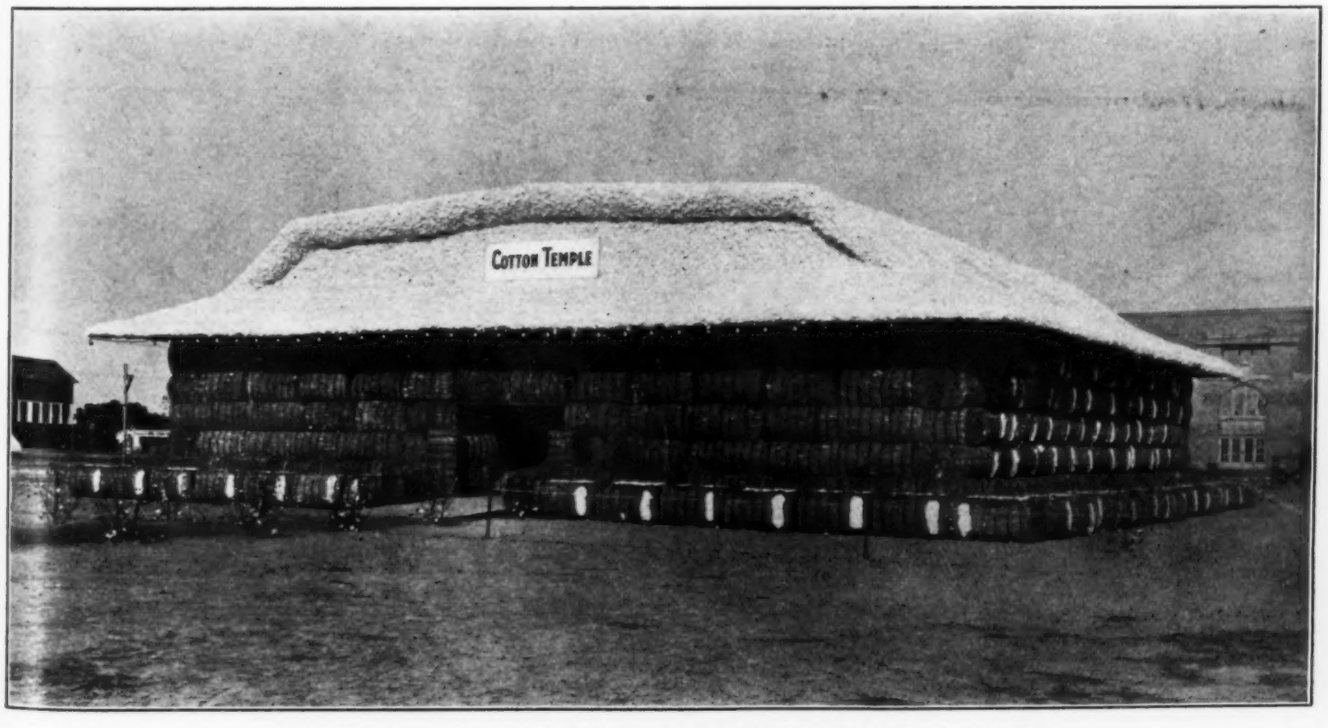
STICKS and stones are not the only material with which a good all around contractor knows how to work. This was proved recently by Fred B. Young & Son of Memphis, Tenn., who built the Cotton Temple shown in the photograph below.

On the Wednesday preceding the Saturday on which the annual Tri-State Fair in Memphis was to open, the officers of the Memphis Terminal Corporation asked the contractors to undertake the job of building the temple. The requirements were a clear span of 60 ft. for the roof trusses and a square building, all other details being left to the contractor.

The design was prepared, the lumber and other material ordered that afternoon and actual work was begun the same evening. Five trusses were erected in place, supported during construction by false work. In the meantime the work of building the walls with more than 400 bales of cotton was carried on. These walls were laid as though they were brick work, but were only one course thick. The trusses were supported by timber columns founded on spread footings directly on the ground.

Open sheeting was placed on the roof rafters and covered with galvanized iron roofing. The cotton on the roof was attached to rolls of unbleached domestic and in order to keep it from blowing off was covered with ordinary chicken wire. The overhang or canopy, which accentuated the temple effect was supported and placed from the trusses and columns, except on the front and rear walls, in which instance it was partly supported by the walls of cotton bales.

The methods of erecting the trusses in place was probably the only available means of finishing the building in time for the opening of the fair, during which it housed a big exhibition of the Memphis Terminal Corporation.



AN UNUSUAL JOB IN WHICH SPEED WAS MORE THAN IM PORTANT.

BRIDGE BUILDING IN THE SOUTHWEST

Ten-Span Structure Near Union City, Oklahoma, Is Example of Efficient Construction Methods

By F. E. Wells

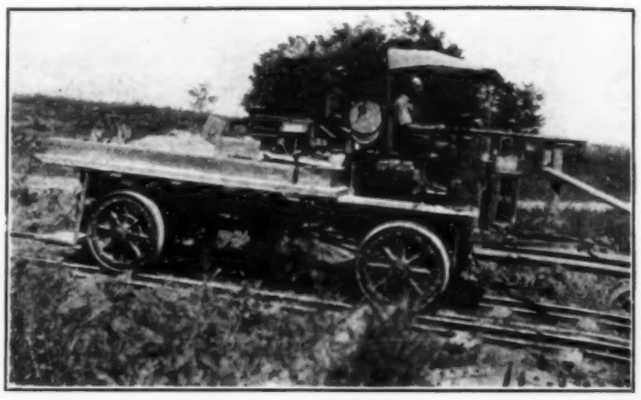
A TEN-SPAN steel bridge erected on concrete piers is just being finished by the Topeka Bridge and Construction Company of Topeka, Kan. This bridge crosses the South Canadian River at Union City, Okla, and is known officially as Oklahoma Federal Aid Project No. 17.

FILLING PIER NO. 7 WITH SAND.

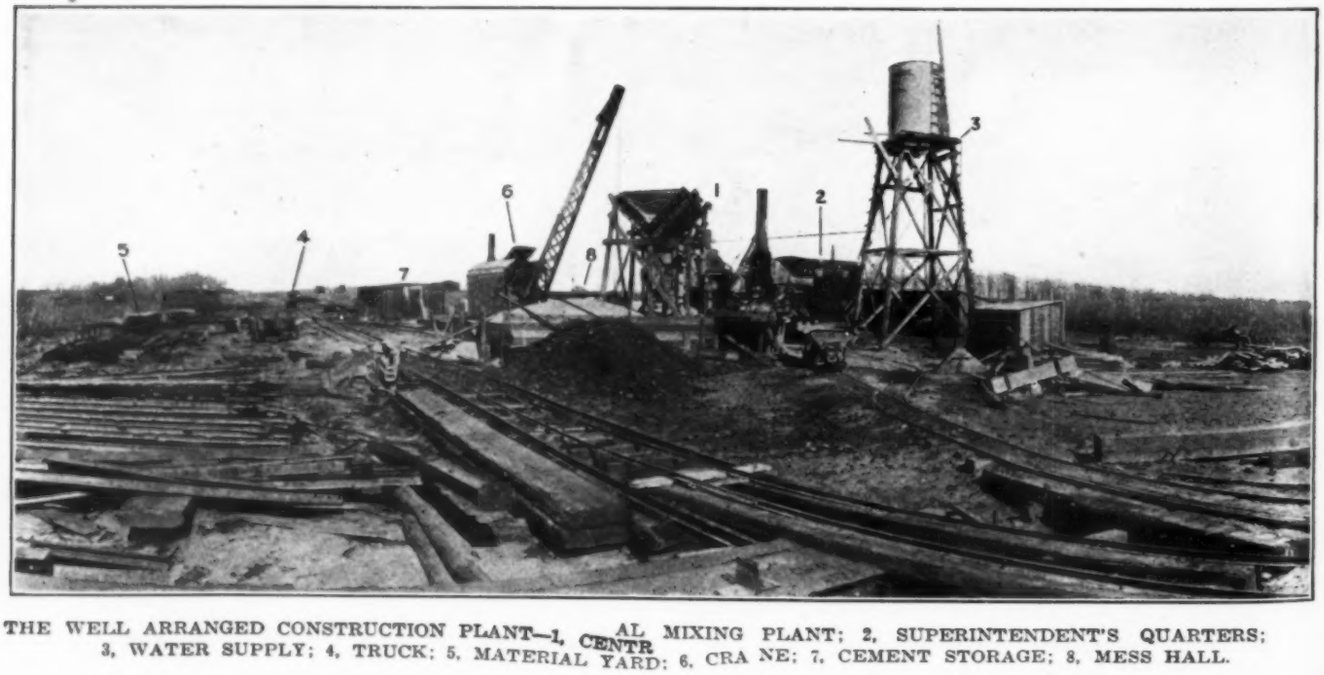
The bridge site is located about two miles from town and it was necessary to build about a mile and a half of standard gage railway to get the materials to the bridge as the roads were not in shape to stand such heavy traffic. The actual hauling was done by means of a motor truck equipped with flange wheels and loaded with ballast. One of the photographs shows this truck. When the cars reach the job they were unloaded by a crane, which also was used up and down the material yard to pick up steel members while the work of erection was in progress. While the concreting of the piers was going on, the crane was used to charge the hopper, all of the concrete being mixed at a central mixing plant.

The foundations for the piers and abutments extend well into a clay foundation. Three of the piers, Nos. 6, 7 and 8, are reinforced inside and out and are sand filled. The method of filling Pier No. 7 is shown in one of the photographs. The sand was pulled up the inclined plane by means of a niggerhead on the gasoline locomotive shown on the right of the photograph.

The remaining piers were built with two shafts, 6 ft. 3 in. square, from shale elevation to low water, and from low water to the bridge seat with two 5-ft. round shafts with an 18-in. wall between them. In driving the piles for the false work a ¾-in. jet was used, and as the false work was driven the water line was extended the full length of the bridge with connections



THE TRUCK WHICH HAULED THE MATERIALS FROM TOWN.



THE WELL ARRANGED CONSTRUCTION PLANT—1, CENTRAL MIXING PLANT; 2, SUPERINTENDENT'S QUARTERS; 3, WATER SUPPLY; 4, TRUCK; 5, MATERIAL YARD; 6, CRANE; 7, CEMENT STORAGE; 8, MESS HALL.

at convenient places. The hoisting engine and the pile driver were moved across the false work on standard gage track so that in case of high water they could be pulled back to safety without difficulty.

The foundations were placed by driving a cofferdam of steel sheet piling and removing the sand with an orange-peel bucket. When the shale was reached it was excavated by jack drills.

The concrete, as stated before, was mixed in a central plant and delivered on the work in industrial cars hauled by a gasoline locomotive. Two 3-car trains were used for this work, one being loaded at the mixer while the other was en route to the job or was being unloaded. The same locomotive handled both trains on 24-in. gage track placed on the same ties inside the standard gage track. The large photograph shows the material yard with this industrial track between the standard gage rails.

During the time the foundations were being built in and the steel work erected, three 8-hr. shifts kept the construction going continuously. The cost of the bridge will be about $350,000 and its length is approximately 1532 ft. At the time of writing only the laying of concrete floors and painting were unfinished.

AIR DUMP CARS HANDLE WASTE ECONOMICALLY

AIR dump cars are proving both practical and economical in the handling of waste which accumulates in all industrial plants. Sometimes when the accumulations of waste are large, as in the Pittsburgh, Pa., steel district, the railroads serving the district handle the waste also. Even the railroads frequently prefer to keep their traffic cars in service, where they are earning money and haul unproductive waste in air dump cars which discharge their loads almost instantaneously, saving time, labor and revenue cars. A constantly increasing number of indus-

CRANE LOADS CARS WITH USED MOLDING SAND.

tries are taking care of their own waste in the same manner, the size of the dump car installed depending largely on local conditions. Ordinarily the largest practical size is used.

For example, the Diamond Alkali Company, at its plant near Painesville, Ohio, hauls the day's accumulation of cinders in 30-yard air dump cars of the best type obtainable, using the waste for filling low ground. So does the Phoenix Utilities Company at Hauto, Pa., and the Tidewater and Standard Oil Companies at Bayonne, N. J., except that there is no low ground to fill at Hauto, among the mountains. The waste there is piled up in the spoilbanks. The Otis Steel Company at Cleveland, Ohio, and the Algoma Steel Corporation at Sault Ste. Marie, Ontario, haul slag, as well as cinders, in 30-yd. air dump cars. The Aluminum Ore Company of America, at its East St. Louis plant, hauls ashes in 20-yard air dump cars, taking out a train load once each day. When the dump cars were installed the labor of 24 men was eliminated and a locomotive and crew were released for other work. The American Steel Foundries Company and the Commonwealth Steel Company in the same district use large air dump cars for disposing of their burnt-out molding sand, as well as ashes.

The use of air dump cars is a favorite method with foundries for handling used molding sand, which must be disposed of regularly and as economically as possible. The adaptation of dump cars for this purpose is well illustrated by a recent installation of 30-yd. air dump cars at the large malleable iron foundry of the T. H. Symington Company at Rochester, N. Y. As in similar plants everywhere, each day's accumulation of burnt-out sand and cinders must be hauled away. Formerly dump wagons were employed for the purpose and the material used in filling some low ground adjoining the foundry. Recently the length of the haul having increased to such an extent that dump

LOADED CAR READY TO LEAVE FOUNDRY.

wagons would not be practical some other method had to be found and 30-yd. air-dump cars were installed. Three of these large cars are kept standing during the day on a loading track back of the foundry. As the waste accumulates it is shoveled by hand into a large skip and taken out to the cars by means of an overhead crane. The three cars are sufficient to take care of a day's accumulation. Once every 24 hours the loaded cars are hauled a distance of five miles and the material is used in filling low ground along the Buffalo, Rochester & Pittsburgh Railroad. Such cars are dumped quickly by means of compressed air, applied from the locomotive.

KLAMATH RIVER ROAD COMPLETED

New Highway Through National Forest Built by Federal Government

THE sort of work which the Federal Government is doing in developing the national forests is well illustrated by the photographs on this page, which show two phases of the construction of the Klamath River road in northern California, which has just been completed.

This highway was begun 4 years ago under the direction of the engineers of the Bureau of Public Roads and construction has been carried on simultaneously from both the northern and southern ends. The final step was the completion of the steel bridge which spans the river midway on the project.

The new highway is 50 miles long and follows the canyon of the Klamath River from the end of the Siskiyou County road near Happy Camp to the Humboldt County roads at Orleans.

The total cost of the highway is about $1,200,000 and all of this was provided from the appropriation for national forest roads except $40,000 from Humboldt County and $40,000 from the State of California. The maintenance of the highway will be undertaken by Siskiyou and Humboldt counties.

WOODEN BRIDGE OVER SALMON RIVER DURING CONSTRUCTION.

Hitherto this part of California has been practically inaccessible except by pack train, and the trip from Happy Camp to Orleans has required about two days' travel. Now it is possible to make the trip by automobile in a few hours.

The upper photograph shows the methods of construction used in building the Salmon River bridge. It was taken before the supporting false work was removed and it also shows the small footbridge used in getting across the river during the progress of the work.

In the lower photograph may be seen a typical section of the new road.

THE KLAMATH RIVER ROAD TRAVERSES COUNTRY WHERE CONSIDERABLE EXCAVATION IS NECESSARY.

ILLINOIS ADOPTS NEW DESIGN FOR CONCRETE ROADS

AS a result of the tests made on the Bates Experimental Road, which were recently completed, a new cross-section design for concrete pavements has been made standard by the Illinois State Highway Department. This new cross-section provides for a thickness of 9 in. at the edges of the pavement tapering to 6 in. at a distance of 2 ft. from the edges. The remainder of the pavement is to have a uniform thickness of 6 in. and the amount and arrangement of reinforcement are to be the same as that hitherto used with the exception of the center-joint material. A new design has been provided for the center joint to correspond with the new 6-in. center thickness.

The Bates tests show conclusively that the strength of the edges of any rigid pavement built according to the design hitherto used is much less than the strength than the interior portion of the slab. These tests disclosed the fact that a center thickness of 6 in., or perhaps even 5 in., is ample to support the legal load limit provided by the Illinois laws, and the new cross-section takes advantage of this fact. The tests further indicate that even with a 6-in. thickness for the main portion of the slab, a 7-in. edge with the ¾-in. longitudinal bar would still not be as strong as the center of the slab. For this reason the thickness of the edges has been increased.

The attention of contractors who expect to bid on Illinois road work is called to the fact that the new cross-section provides 1 sq. ft. less of cross sectional area than a slab having a 7-in. uniform thickness. This means that the new cross section will require 195½ cu. yd. less of concrete per mile of pavement than the standard 7-in. design heretofore used.

The matter of shaping the subgrade to accommodate the new cross-section has been studied by the department and it has been determined that the extra cost will be very small as subgrading machines may easily be adapted to cut the subgrade to the new form. Even should the subgrade be cut to the usual crown at an elevation 6 in. below the top of the forms and the dirt along the edges thrown out by hand, it may be seen that the additional cost of shaping the subgrade would be but a small item.

Frank T. Sheets, Superintendent of Highways, and Clifford Older, State Highway Engineer, feel that the new design will meet with favor both from contractors and from all interested in progressive highway development.

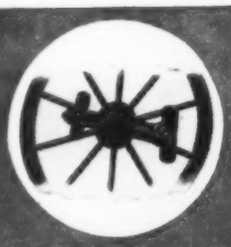
FARM TEAMS HAUL MATERIALS FOR COLORADO ROADS

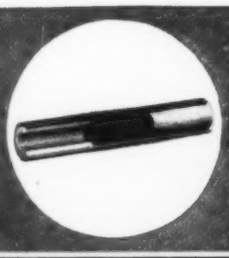
THE State Highway Department of Colorado has been making use of farm teams in road work and has found that this method works well in agricultural communities. It was decided to offer 25 cents per yard-mile for hauling various kinds of surface material and 15 cents per yard for the labor charge of loading. The Seventh Division of the highway department put the plan into effect and at no time has the work been handicapped by shortage of teams. About 2000 teams have turned up for the road work during the season which began in March. No argument over pay is possible as the haulers know every night the amount they have moved each day.

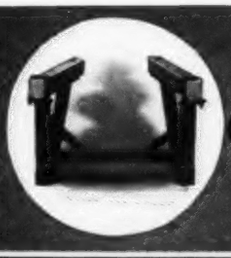
A group of farmers working from one pit under exactly the same conditions naturally becomes imbued with a spirit of rivalry which means more work.

In conducting the work the available pits along the road to be improved are located, distances determined from the pits to the roadway, the work stationed off at 100-ft. stations and checkers with specially prepared sheets are assigned to the project. The sheets carry across the top margin the various team numbers which have been assigned to the haulers when they go to work. These numbers together with the names of the men to whom the numbers were given have been entered in a ledger in the office. The sheets show each day the numbers of the different stations at which the teams have unloaded, the number of loads hauled, the amount of the load, the hours worked, etc. At night these station numbers are reduced to distances, entered in the ledger under the name and number of the team and the day's earnings figured.

A STRING OF FARM TEAMS ENGAGED IN ROAD WORK.


10 Spoke Wheel


Self Lubricating Bearings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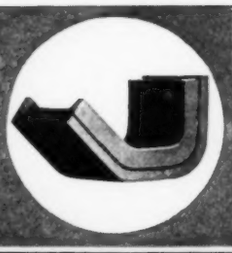
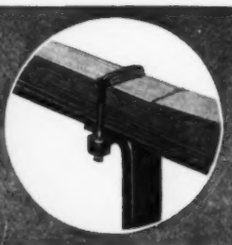


Handle Clamps



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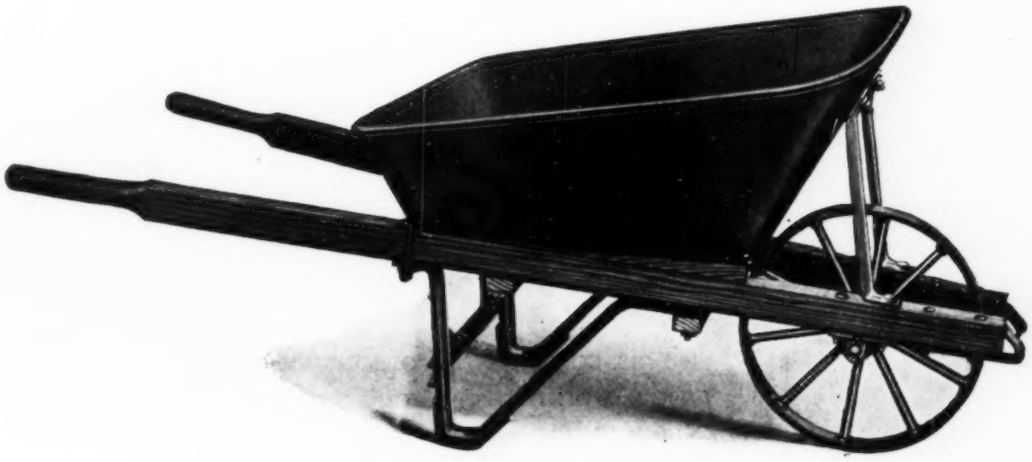

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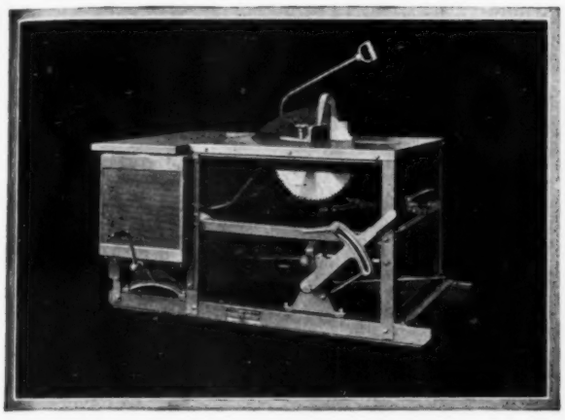

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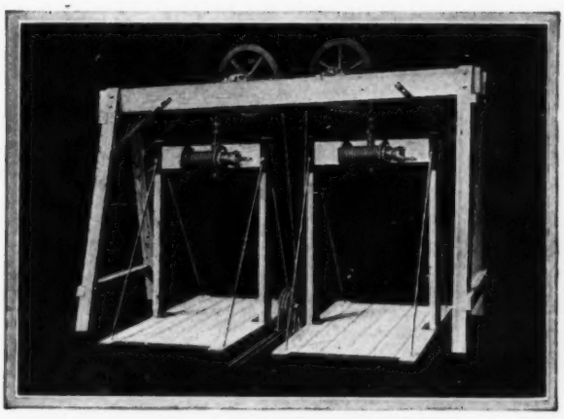
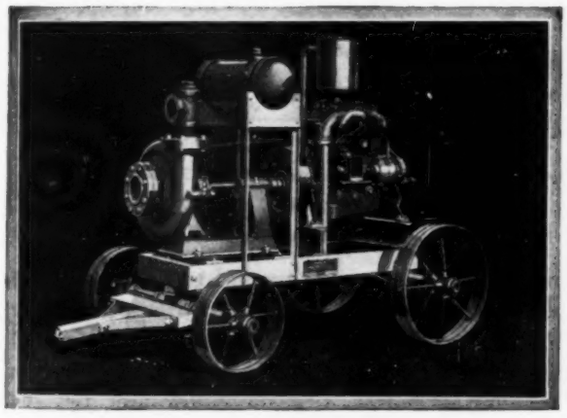
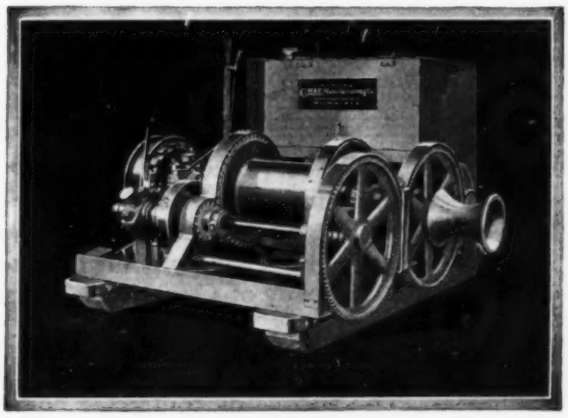


C. H. & E. MATERIAL ELEVATOR

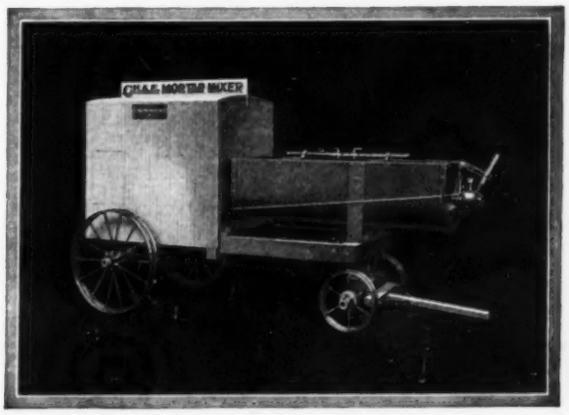


C. H. & E. NO. 10 CENTRIFUGAL PUMP



C. H. & E. NO. 7 REVERSIBLE HOIST

C. H. & E. NO. 10 DUAL TRIPLEX PUMP



C. H. & E. NO. 3 MORTAR MIXER

— Write for Our Catalog —

C. H. & E. Manufacturing Co., Inc.

384-A Clinton St. Milwaukee, Wis.

All Seasons

ALL SET FOR WINTER?

How about it? Winter means a lay off for some shovels but not for the Thew. The Thew owner knows he's fixed right. That's why the Freshwater Construction Company of Cleveland is just starting a big job.

Buying a steam shovel is no matter for snap judgment. The successful contractor considers them all and buys the one he knows is the best. That's all Thew expects you to do.

Look over the different makes. Compare them point for point—design, construction, performance. Find out for yourself which is recognized as the best all-year-around shovel.

Compare the other continuous treads with the Thew. Pay particular attention to the power steer—the two speeds—the suspension—the method of drive—the design of the treads. Details mean the success or failure of your equipment. It pays to know them.

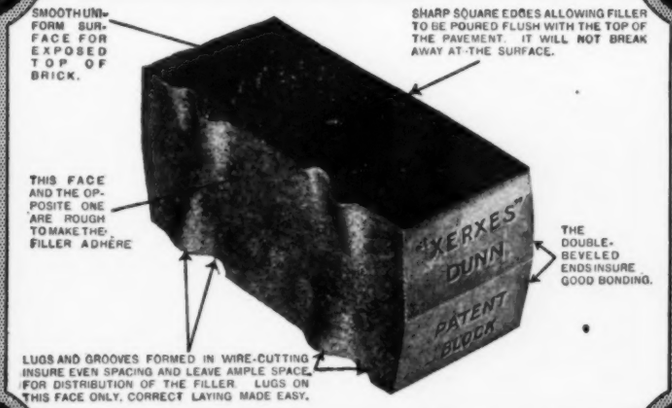
Why not write today for YOUR copy of Bulletin 111-X.

THE THEW SHOVEL COMPANY, LORAIN, O.

Thew Power Shovels

WIRE-CUT LUG BRICK

A Wire-Cut Lug Hillside Brick


SMOOTH UNIFORM SURFACE FOR EXPOSED TOP OF BRICK.
SHARP SQUARE EDGES ALLOWING FILLER TO BE POURED FLUSH WITH THE TOP OF THE PAVEMENT. IT WILL NOT BREAK AWAY AT THE SURFACE.
THIS FACE AND THE OPPOSITE ONE ARE ROUGH TO MAKE THE FILLER ADHERE
THE DOUBLE-BEVELED ENDS INSURE GOOD BONDING.
"XERXES" DUNN PATENT BLOCK
LUGS AND GROOVES FORMED IN WIRE-CUTTING INSURE EVEN SPACING AND LEAVE AMPLE SPACE FOR DISTRIBUTION OF THE FILLER. LUGS ON THIS FACE ONLY. CORRECT LAYING MADE EASY.

End View—Two Wire-Cut Lug Brick—Note joint spacing

ONE BILLION SIXTY-FOUR MILLION NOW IN SERVICE

IN STREETS AND HIGHWAYS THROUGHOUT THE UNITED STATES AND CANADA

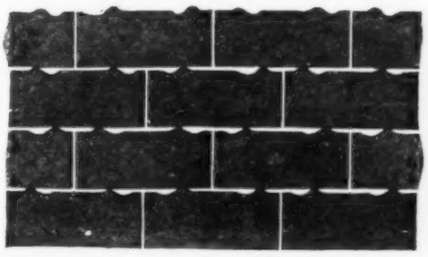
Scientifically designed to meet the requirements of exacting engineers.

Costs no more per square yard than ordinary brick.

Made in all standard sizes by reputable and progressive manufacturers everywhere.

THE SOUTHERN CONSTRUCTION CO. CHATTANOOGA, TENN. *SAYS:*

"WE have laid several millions of wire-cut lug bricks and have a high opinion of them. Our experience has demonstrated that it is possible to get a better bond, a more even surface and a stronger pavement with wire-cut lug brick than with other brick."



Alignment of Wire-Cut Lug Brick in Courses, Showing Uniform Spacing for Filler.

Uniform spacing requires wire-cut lug brick. This is imperative with either bituminous or cement filler.

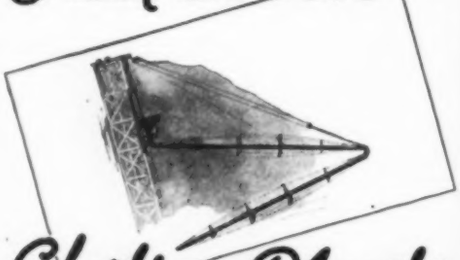
A wire-cut lug brick pavement is the pride of its builder.

Ask for list of competing manufacturers in your territory.

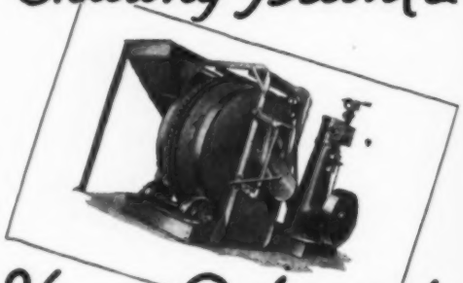
THE DUNN WIRE-CUT LUG BRICK CO.

LICENSORS CONNEAUT, O.

Steel Towers and



Chuting Plants



Heavy Duty and

Small Mixers

Cars and Track

Clam Shells

Three Full Years of Hard Work—

$23.00 Maintenance Cost Including Repair Parts

is the record of this one-bag Lakewood Mixer.

It is break-downs and lost time waiting for repairs that you want most to eliminate—the record of this machine means sturdiness and long life—but most of all greater speed and continuous operation on the job.

Records of this kind prove the worth of Lakewood Mixers.

Write for Bulletin 21-E
It tells the story.

The Lakewood Engineering Co.
Cleveland, U. S. A.

Complete Road Plant—Paving Mixers, Road Forms, Gasoline Locomotives, Track, Batch Boxes, Subgraders, Finishing Machines, Clam Shells, Grout Mixers, Tunnel Traps

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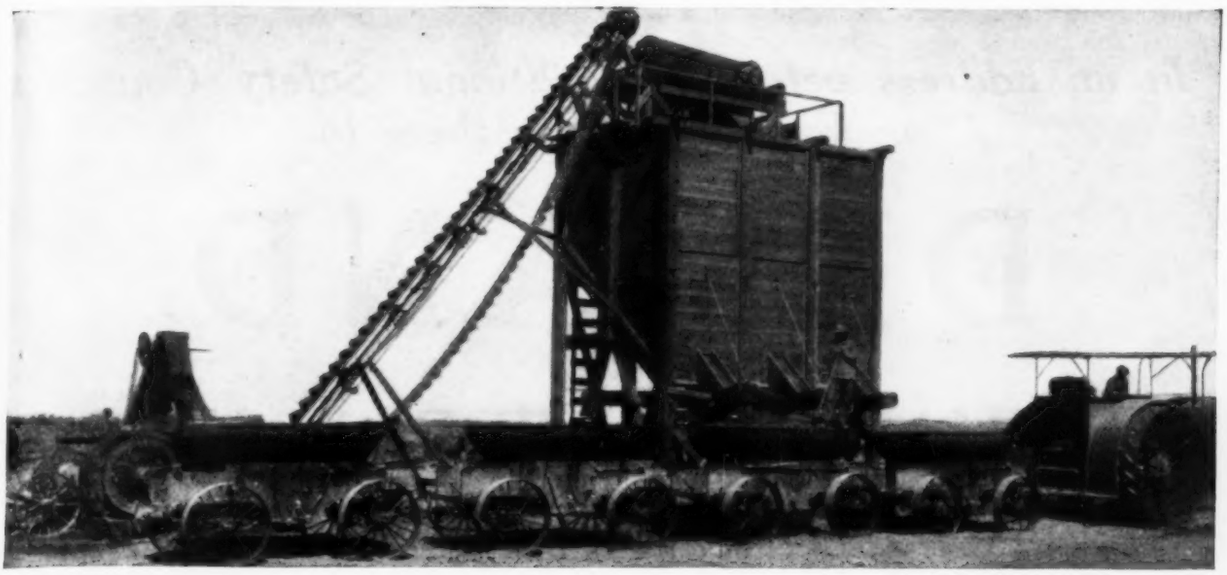
ALMACO ALLIED MACHINERY COMPANY OF AMERICA ALMACO



CUTTING CRUSHING COSTS

HUNDREDS of Western-Aurora plants are doing it today. The unique design of the crusher increases capacity, eliminates vibration and saves power. Materials and workmanship of the highest grade insure continuous operation and long life.

Catalog 44-X describes crushers, elevators, screens and bins in detail. Write for a copy today. You will find it interesting.

THE AUSTIN-WESTERN ROAD MACHINERY CO.

HOME OFFICE—CHICAGO

WAREHOUSES AND SERVICE STATIONS IN 22 CITIES

AUSTIN

Reversible Road Machines
Motor Road Rollers
Steam Road Rollers
Tandem Rollers
Roller-Scarifiers
Grader-Scarifiers
Road Scarifiers
Gyratory Rock Crushers and Crushing Plants
Elevating Graders
Dump and Spreader Wagons
Motor Sweepers
Culverts

WESTERN

Reversible Road Machines
Rock Crushers and Crushing Plants
Road Planers
Elevating Graders and Dump Wagons
Screening Plants
Scarifiers
Road Drags
Wheelers, Scrapers and Plows
Ditchers and Back Slopers
Dump Cars

In an address before the National Safety Council an Engineer urges them to

DEMAND

THAT ALL WIRE ROPE SHALL BE MARKED THE WAY

WILLIAMSPORT

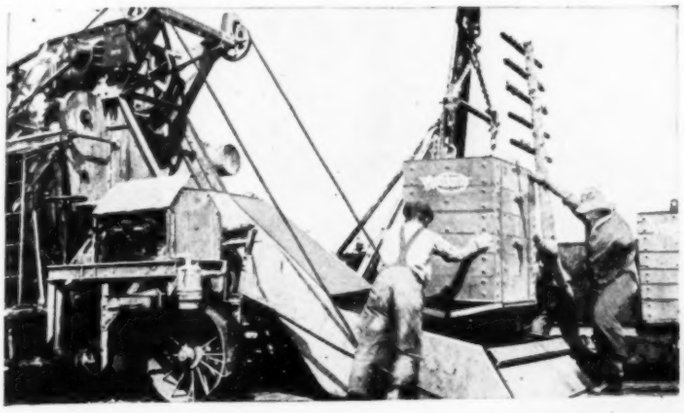
is being marked—for your protection.

This booklet shows the new marker—send for it—it is considered by authorities as "the greatest advancement in the wire rope industry"—and if you want to compare the request upon the National Safety Council with what has been actually accomplished by Williamsport—ask also for a copy of the above mentioned address.

SEND FOR THIS BOOK

WILLIAMSPORT WIRE ROPE CO.

General Sales Offices
Peoples Gas Bldg. Chicago



Concrete Road Construction Scenes on the Cannon Ball Trail near Galesburg, Ill.

Western

That's Why

Industrial Haulage, with Western Cars and Batch-Boxes.

They Chose Industrial Haulage

Two partners are handling the concrete road work shown in the pictures. One **operates nine trucks** in another business—knows all about them—their cost—their limitations. The other for 12 years has studied all kinds of road-building methods, as a **Resident Engineer** for the State Highway Department.

They Adopted Western Industrial Haulage (not trucks) for their road job.

Think that over and let it's significance sink in.

"It is a most efficient method of transportation," explained the engineer, "and so simple! Only **two** small engines to look after instead of the engines in at least eight complicated **trucks**, with tire trouble on top of that."

Let our road engineers help you to determine the most economical installation and layout for your contract. The mere sale of an outfit does not satisfy us. We want your contract to net you a profit.

WRITE TODAY.

Western Wheeled Scraper Co.

Earth and Stone Handling Equipment

AURORA, ILL.

On the job shown in the photograph above, the Barber-Greene Conveyor of E. J. Inman, Ashtabula, Ohio, loads a five ton truck in one and one-half minutes. The photograph below shows the type of hopper construction used on this job.

How an Ohio roadbuilder makes material move faster

No crane, no bins, just one Barber-Greene Conveyor and two years of educating results

On the Rome-Morgan road last year, E. J. Inman of Ashtabula, Ohio, found that a ¾ yard crane could unload a maximum of six cars of slag into bins. Its daily average was only four cars.

At the time it didn't seem likely to him that equipment costing much less to buy and operate could do more than twice as much.

It was demonstrated, however, that a Barber-Greene Portable Conveyor on the same job could unload as many as twelve cars into bins and average ten.

He replaced the crane with the Barber-Greene.

But he kept the bins.

This year, however, he has found that he can load a five-ton truck, directly from the car, in one and a half minutes. He has also found that without making a new set-up he can pivot the Barber-Greene to unload on two stock piles. By changing his set-up he can use the Barber-Greene to reclaim from the stock pile.

So this year he doesn't use bins any more.

But he is still using the same Barber-Greene Portable Conveyor that he began using last year. He hasn't even had to replace its belt, in spite of the fact that slag is probably the most abrasive material handled by roadbuilders.

All he has done, in addition to cutting costs by doing away with the crane and his bins, is to buy a second Barber-Greene Portable Conveyor for another job.

Perhaps his case is exceptional, for conditions do vary considerably. Many contractors who use Barber-Greene Conveyors keep either their bins or their cranes, sometimes both.

How Barber-Greenes are used to cut costs and speed handling on 24 typical jobs is described in "Results on Road Jobs." This book is free. Fill in your name and address in the coupon and we will send it to you.

Barber-Greene Company

530 W. PARK AVE., AURORA, ILLINOIS, U. S. A.

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Canadian Agents: Mussens Limited, Montreal, Winnipeg, Toronto, Vancouver

EXPORT DEPARTMENT

ALMACOA — ALLIED MACHINERY COMPANY OF AMERICA — ALMACOA

51 Chambers St., New York, U.S.A. Cables: Almacoa New York

These two photographs show Barber-Greene Bucket Loaders at work for Mayer and Ryan, of Chicago, on a job at Ludington, Mich. Cars are unloaded in 1½ hours and two-ton duo batch and end-dump trucks, loaded at the rate of one minute, eleven seconds per batch.

How Chicago contractors have done it for two years in Michigan

One hour and 30 mins. for unloading a car, 2 mins. 21 secs. for loading a truck

On the Ludington-Pentwater Road last year, Mayer & Ryan of Chicago used two Barber-Greene Bucket Loaders equipped with 18 cu. ft. measuring hoppers to measure and load batches of stone and sand into two-ton trucks with duo-batch, end-dump bodies.

The sand and stone were in stock piles on docks.

The average time for loading two complete batches into a truck was 2 minutes and 21 seconds. This means a rate of 1 minute 11 seconds per batch—faster than batches can be put through the mixer.

This year the nature of the job has changed, but the Barber-Greene Bucket Loaders are working as profitably as ever for the contractors.

The material now comes in in cars. The Barber-Greenes are backed up until their disc feeders are against the outer rails of the track. Then the cars are dumped, and two men in the car shovel the material that does not flow naturally into the dumper. In this way cars have been unloaded in an hour and a half.

The ways in which Mayer & Ryan have used their Barber-Greenes, however, gives only an incomplete idea of the usefulness, speed and economy of this equipment.

In Indiana, Shea and Company use Barber-Greene Bucket Loaders to load industrial cars from small stock piles placed at frequent intervals. This system saves extra miles of track, two locomotives, many batch cars and a number of men.

In Massachusetts, the New England Sand and Gravel Company of Boston uses a Barber-Greene to cut the cost of loading to 4 cents as against a former hand shoveling cost of 25 cents per ton.

Other ways in which Barber-Greenes are used on 24 typical road jobs is described in "Results on Road Jobs"—a free book with illustration, diagrams and descriptions detailing how contractors in all parts of the country are improving their methods of handling materials.

Send this Coupon

BARBER-GREENE COMPANY,
530 W. Park Avenue, Aurora, Ill.
Please send me "Results On Road Jobs". (No obligation.)
Name _____
Company _____
Address _____

Barber-Greene Company

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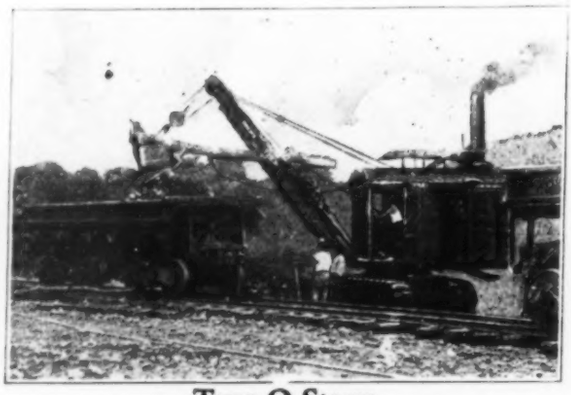
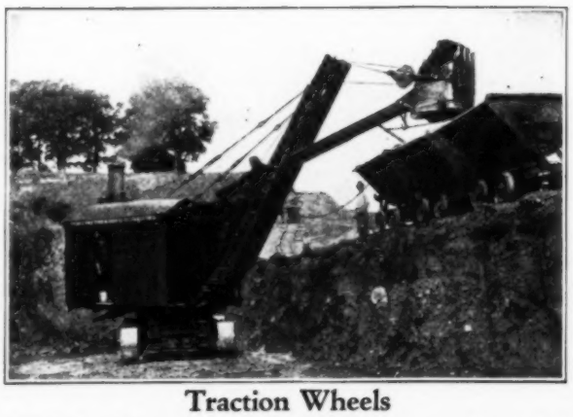
Has No Equal



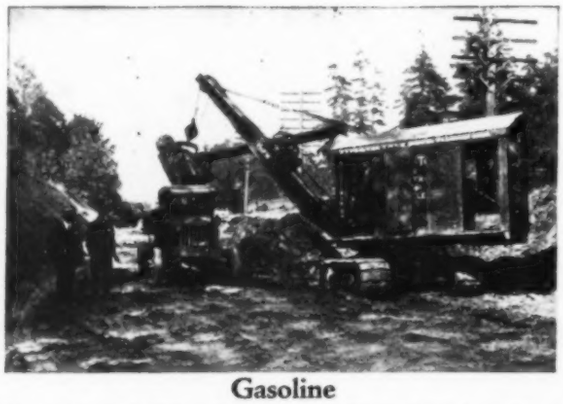
Type O Steam

250,000 yards in six months. Working double shift the shovel dug and loaded the dirt for France Fill down at Panama.



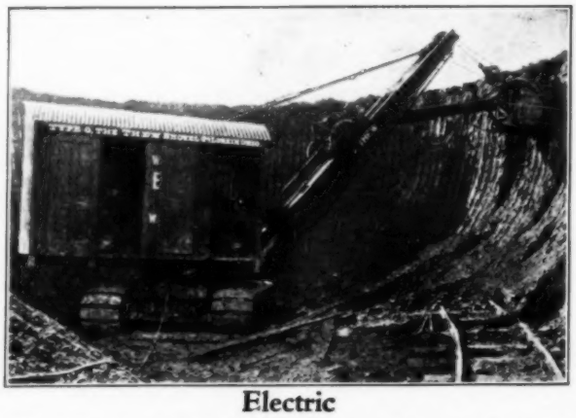
Traction Wheels

With his Type O Herman Hohensee took out the 100,000 cu. yds. of this reservoir excavation in short order.



Gasoline

Up in Seattle Woods Bros. and Tomei are handling a big share of the Northwest road program with their gasoline Thew.

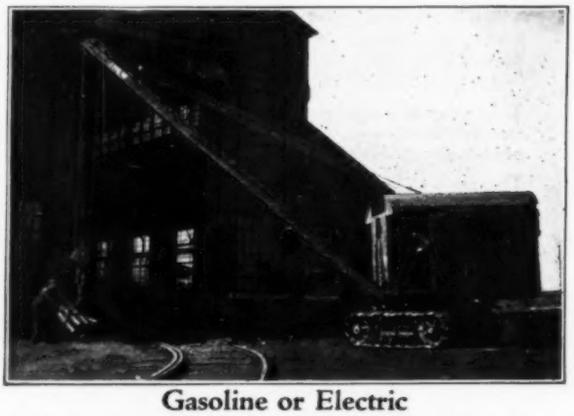


Electric

West Bros. of Washington know they can depend on their electric Thew to supply plenty of thoroughly mixed clay for 100,000 bricks a day.

Steam Crane

One Pittsburgh Company uses its clam shell outfit for loading, unloading and rehandling material.



Gasoline or Electric

And right at home in Lorain this Gasoline Type O Crane has paid for itself in the yard of The Lorain Casting Company.

THE THEW SHOVEL CO., LORAIN, OHIO